The Farm

QUARTERLY

UTUMN 1949 • PRICE 60 CENTS

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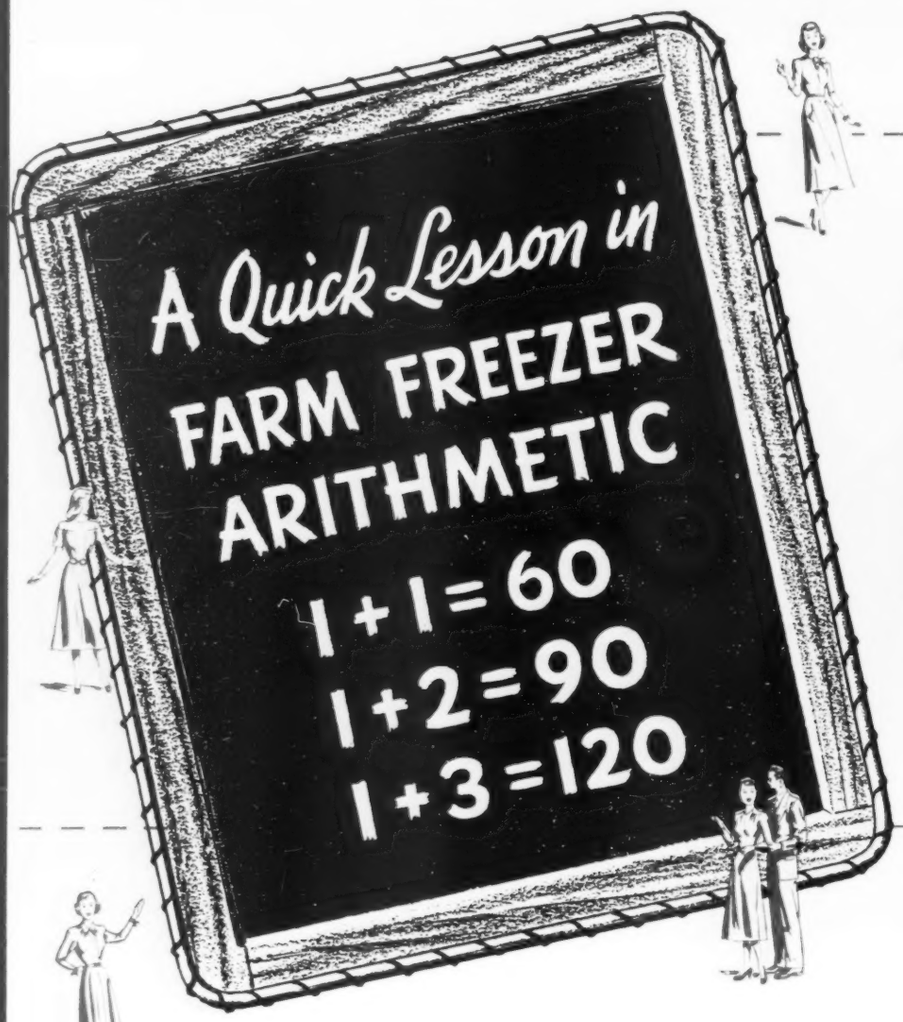
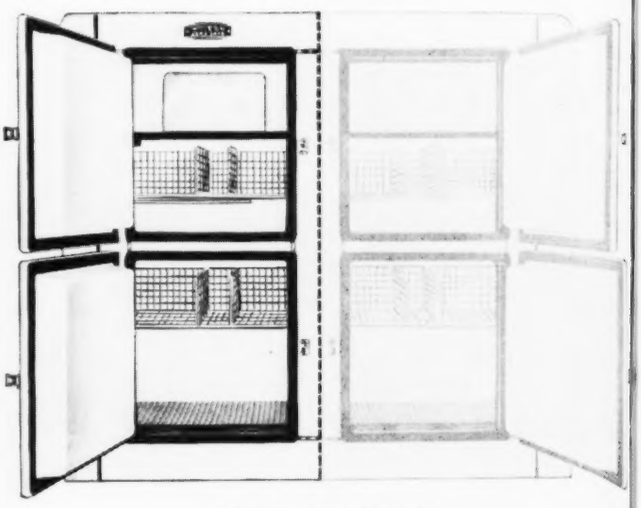
TECHNOLOGY & SCIENCE

ZADRUGA—Farming behind The Iron Curtain





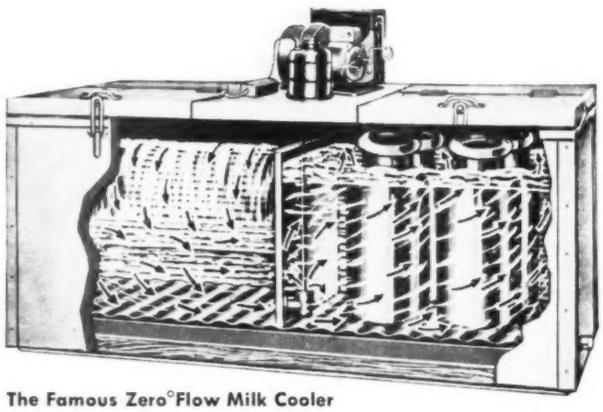
Sectional Model FF-60

You quickly learn that this is sound arithmetic when you buy a Wilson Sectional Farm Freezer. Start off with an FF-30—as you need more freezer storage space, just add another FF-30 section and you have 60 cubic feet. The second section becomes an integral part of the unit—the installation is simple and it costs much less than buying additional complete new units and there is no "trade-in" loss.

You can continue to add sections as your needs increase. Each section has its own big contact type quick-freeze compartments.

Less floor space is needed with Wilson "upright" design and front opening convenience is a standard feature of these lifetime cabinets of rugged, all-steel construction.

When you see your nearest dealer about Wilson freezers, ask him to show you the famous line of Wilson Milk Coolers, too.



The Famous Zero°Flow Milk Cooler

WILSON REFRIGERATION, INC.
DIVISION OF WILSON CABINET CO., INC.
SMYRNA, DELAWARE
Dealers everywhere or write us Department A-FQ

WILSON REFRIGERATION

Farm Milk Coolers and Freezers

The 2-row McCormick No. 24 can pick 20 or more acres a day; stores in less space than a wagon; can be mounted or removed in 15 minutes by one man.

Pick your own corn . . . on time

with this 2-row McCormick Picker

WHEN THE CORN IS READY—in 15 minutes you mount the McCormick No. 24 picker on a Farmall H or M tractor—and you are ready to go.

As you swing into the field, you notice that you can see either row being picked ahead of you.

You notice that the gathering units are built low *and* wide to pick up down and leaning corn. Units can be raised or lowered easily by Farmall hydraulic Lift-All.

The combination snapping and husking rolls give you clean, *straight-through* picking.

Glance behind you for evidence of a clean picking job . . . the corn is free of trash and husks . . . clean, like the load shown above.

Now look at these features. They explain how the McCormick No. 24 picks *more* corn, in every field.

- Snapping and husking rolls are adjustable for green or matured stalks. Choice of *two* roll speeds.
- Light weight; fewer moving parts; economical operation.
- Large-capacity ear corn hopper and elevator.
- Open fields anywhere without damage to unpicked rows.

See your International Harvester dealer today for more information about the No. 24. Have him also tell you about the 1-row pull-type No. 14-P and the heavy-duty 2-row No. 2-M—a mounted picker for Farmall M, MD, F-20, and F-30 tractors.

INTERNATIONAL HARVESTER

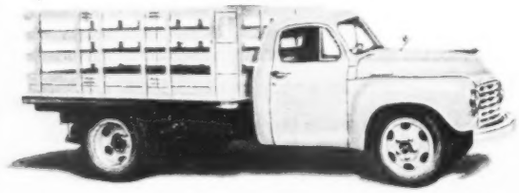
CHICAGO 1, ILLINOIS

International Harvester Builds
McCormick Farm Equipment and Farmall Tractors
Motor Trucks . . . Industrial Power
Refrigerators and Freezers

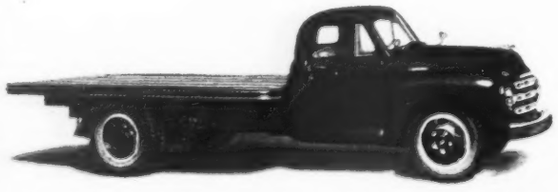
LISTEN TO JAMES MELTON ON "HARVEST OF STARS" EVERY SUNDAY AFTERNOON ON NBC.

1½-ton shown with 12-foot grain body—2-ton model also available

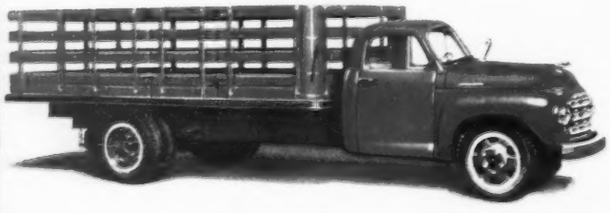
½-ton 6½-foot pick-up—¾-ton and 1-ton 8-foot pick-ups also available



1½-ton 9-foot platform stake—1-ton model also available



1½-ton 12-foot platform—2-ton model also available



2-ton 14-foot platform stake—1½-ton model also available

A Studebaker truck gives you plenty of power and plenty of economy!

MAKE your next new truck a truck that starts to pay its way the very first mile you drive it.

That's the money-saving kind of truck that pacemaking Studebaker has ready for you—in a size and wheelbase just right for every farming need.

Whether the loads you haul are hefty or small, you get plenty of low cost power and top performance every time and all the time with a Studebaker truck.

You cash in to the full on the brilliant modern engineering and 97 years of experience that have won for Studebaker the respect and confidence of American farmers from coast to coast.

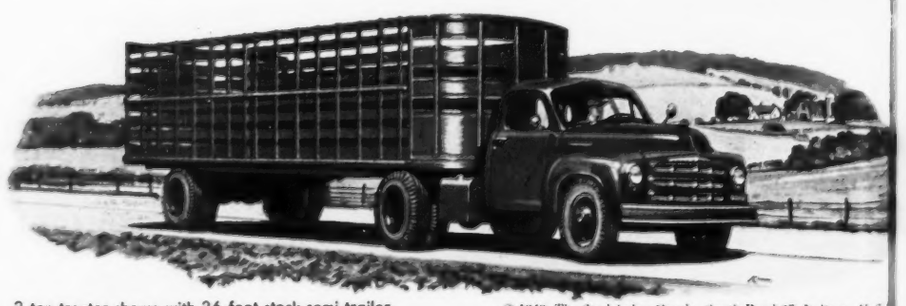
The world-famed Studebaker "Econ-o-miser" engine that powers the ½-ton, ¾-ton and 1-ton Studebaker trucks now has an impressively thrifty team-mate.

It's a new 100 h.p. "Power Plus" engine 200 lbs. ft. torque for 1½ and 2-ton service! It makes the new series 16A and 17A Studebakers stand-outs in pulling power, staying power and low operating costs.

Stop in at a showroom and check up on the new Studebaker trucks. See how far ahead they are in solid money's worth.

STUDEBAKER TRUCKS

Noted for low cost operation



2-ton tractor shown with 26-foot stock semi-trailer

© 1949, The Studebaker Corp'n, South Bend 27, Indiana, U. S.

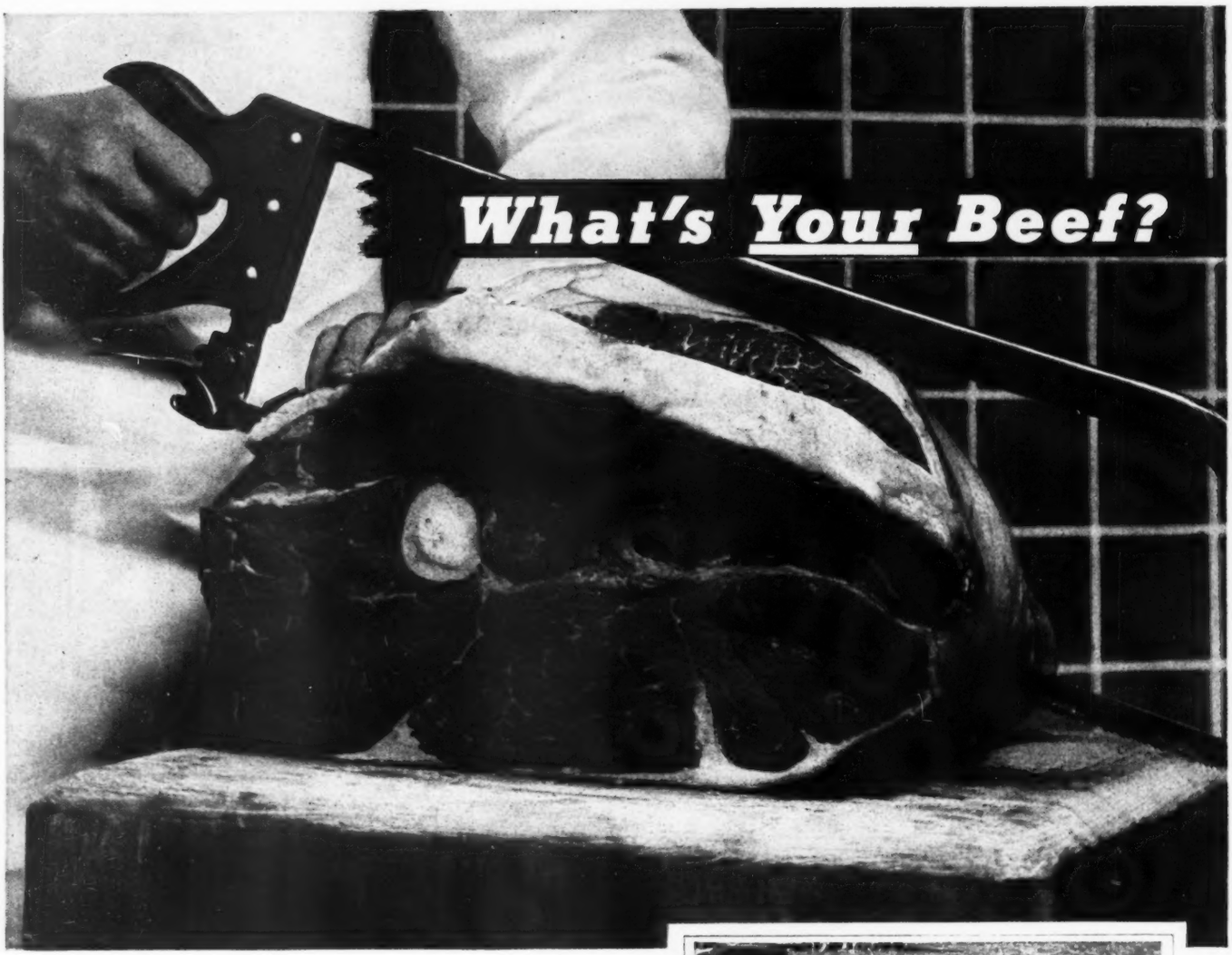
LET'S talk facts . . . Here is a tire that has extra bar height, extra bar length, and a curved bar design that outcleans, outpulls and outlasts any other tire. NO OTHER TIRE has all these advantages.

The massive bars of the Firestone Champion take a bigger bite and a better hold — and THAT'S NOT ALL. Because they're curved for self-cleaning, these bars keep right on pulling long after ordinary tires clog and spin in their own tracks.

And here's another point — Every inch of tread-bar length does its share of the pulling because the low-pressure design of this tire puts ALL of the tread in FULL ground contact for a FULL TRACTION BITE. Because it's patented, the Firestone Champion gives you advantages which no other tire has. So . . . when it's time for a new tractor or for new tires, remember to use Firestone!

Listen to the Voice of Firestone every Monday evening over NBC and Americana over NBC Network Television Stations

Copyright, 1949, The Firestone Tire & Rubber Co.

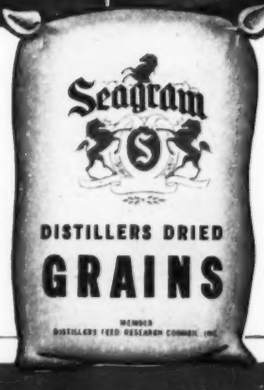


Is your beef choice top-grade beef like this . . . or lower grade, lower profit meat? Have you wondered how others *consistently* raise premium beef for premium prices?

If you have not been satisfied with the finish of your steers send today for ration formulas used by hundreds to bring their cattle to fine, top quality finish — the finish that pays off in extra profits. Seagram Dried Grains and Solubles, important factors in these formulas developed through years of research and practical feeding, can be used economically and profitably by you, too!

JOSEPH E. SEAGRAM & SONS, INC.
Grain Products Division • Box 240, Louisville 1, Ky.

Seagram Dried Grains and Solubles are available through dealers for use in feeding all types of livestock and poultry.



Seagram

SERVICE TO AGRICULTURE

COMING IN WINTER

Since we have advanced the publication date of the Winter issue to early December, and the *Quarterly* will be on the reading table during Christmas vacation, we have given special attention to articles of interest to the whole family.

The American farm may at long last have an architecture of its own. The last American barn is a good deal like the first barn, and farm homes are little more than indifferent copies of city homes. Now there appears to be a movement on foot among prominent architects, among them Walter P. Gropius of Harvard, to give farm buildings a new look—designs will be functional and beautiful and in harmony with rural settings. These are mostly dreams just now, but *Farm Quarterly* will show you some of the dreams.

The third in a series of articles on farmers of other lands will be on Ireland. Over-populated, under-industrialized and scrapping among themselves and with the British, these admirable people have managed to eke out a scant living on their stingy soil. Our editor, R. J. McGinnis, gives us his observations on Irish farming, taking us to a farm on the banks of the Shannon.

Crop stories will include: Sweet corn, a cash crop in the corn belt; birdsfoot trefoil, soil builder and pasture grass; and seed pelleting, an aid to planting and early germination. Farmers and experiment stations in the corn belt have been busy designing the last word in hog houses and shelters. *Farm Quarterly* will survey the field, recommend an ideal house, and supply the building plans in an article on which farmers and extension experts are collaborating. A breed association story answers the question: Are the breed associations helping farmers to upgrade their stock, or are they confusing him with red tape? There will be a short article on the ancient sport of cock fighting and the breeding of fighting poultry.

Listed as probables on soil and cultivation are stories on the mighty power of the raindrop and a definitive discussion of how to apply plow sole fertilizer, the results to expect and comparison with other methods.

Our specialty article will be on blackberries, a crop which has pulled many hill farmers out of the red. There will be two short, timely features, one on how poinsettas are raised and shipped to the East to brighten up the Christmas scene, and another on snakes, the farmers' friend.

The best time to plan next summer's work is during the winter, when you can sit in front of the fireplace and take your time. A detailed study of efficiency on the farm and how farmers can organize their work to cut down on labor and accomplish more in less time will be one of the full length features of the Winter issue.

THE FARM QUARTERLY
22 East 12th St., Cincinnati 10, Ohio

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To the man buying his next tractor

—Here's what you

Ford®
TRACTOR

Every year thousands of farmers face the need of buying a new tractor . . . and sometimes the question of whether to switch to another kind. If this is your problem, we invite you to take a long look at the Ford Tractor . . . and learn about the many ways in which it offers you outstanding value.

Some of the reasons why many experienced tractor farmers switch to the Ford Tractor are described and illustrated on the opposite page.

When you buy your next tractor, we think you too, will want a tractor that has flexible power that fits each job . . . constant control of working depth . . . easy, quick attaching of implements . . . hydraulic power lifting and lowering of implements at a touch . . . a year 'round Tractor with matched implements, for a great variety of jobs all 'round the farm.

In the Ford Tractor you will have all these important advantages and many, many more. You will have a tractor that is backed by forty years of Ford farm engineering experience and by manufacturing skill gained in building more than one million Ford Tractors. You will have the advantage of a nearby friendly dealer, through whom parts and service are always available. These many advantages . . . plus the low price of the Ford Tractor and its well known operating economy . . . add up to more value for your tractor dollar.

For you, maybe *this is the year* for making a change of tractors . . . or for getting an additional tractor, in order to farm more profitably or more easily. When you reach this decision you will want to be satisfied that you have selected the *right* tractor for your needs. This is important. You will want to learn all you can about the Ford Tractor and Dearborn Implements from your nearby Ford Tractor dealer. He is ready to let you try out a Ford Tractor, right on your own farm . . . to help you make the wise choice.

DEARBORN MOTORS CORPORATION • DETROIT 3, MICHIGAN

Join the thousands of farmers who are making the Ford Tractor their choice

want to look for . . .

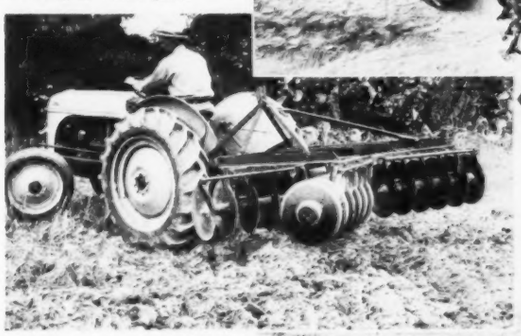
- **Flexible Power—fitted to each job**
- **Easy, Quick attaching**
- **Lifting . . . Lowering at a touch**
- **Constant control of working depth**
- **A year 'round Tractor**

with matched implements for a great variety of jobs all 'round the farm

An important reason that many farmers give for changing to the Ford Tractor is the extensive line of Dearborn Implements, specially designed to work with the Ford Tractor. Durably constructed of finest materials and thoroughly field-tested, Dearborn Implements take full advantage of the Ford Tractor's Hydraulic Touch Control and Quick Attaching features. Dearborn Implements are reasonably priced, and you probably will be surprised to find how little it costs for the equipment you need to get started.

Flexible Power, fitted to each job, is illustrated here by the Dearborn Moldboard Plow. In heavy going, resistance is automatically converted into forces that help increase traction and pulling power.

The Ford Tractor's Quick Attaching adds value to the Dearborn Rigid Shank Cultivator. Any of the several Dearborn Cultivators can be attached or detached in one minute or less . . . a great advantage in changing from cultivating to mowing or other jobs.



Lifting and Lowering by Ford Tractor Hydraulic Touch Control means much with the Dearborn Lift Type Tandem Disc shown. There's no road damage to the implement; you get quick, easy turning and backing; there's no cutting of grassed waterways. No ridges left at the ends of the field.

Constant Control of Working Depth through Ford Tractor Hydraulic Touch Control and Implement Position Control applies to the Dearborn Field Cultivator and many other implements. You have a choice of *three* ways to control depth, depending on field and soil conditions.

The All 'Round nature of the Ford Tractor is here illustrated by the Dearborn Standard Manure and Material Loader. Many other tools for ditching, leveling, terracing, sawing and post hole digging are available.

Dearborn
FARM EQUIPMENT

THE SIGN TO LOOK FOR . . . THE MAN TO KNOW

This sign marks the headquarters of your nearby Ford Tractor dealer. He and his organization sell Ford Tractors and Dearborn Farm Equipment and offer you expert service and genuine parts. Under this sign, you will find friendliness and a genuine interest in helping you make the most of your farming opportunities. It will pay you, we feel sure, to know your nearby Ford Tractor dealer better.

The only Time that Counts is Working Time

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Ford Farming MEANS LESS WORK... MORE INCOME PER ACRE

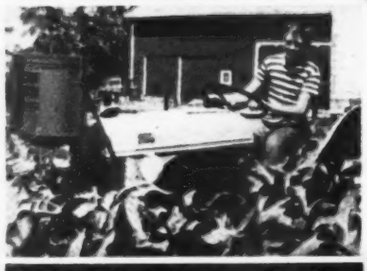
Farmer Feeder Products

The All Electric
FARMER
broadcast
SEEDER
First with Farmers Everywhere

can be mounted on front or rear of tractor, truck, jeep, etc.

FARMER FEEDER
Quality
HOG LOT
EQUIPMENT

Summer-Winter Founts

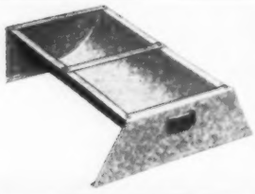


Sows any seed or grain that can be broadcast

All Metal Feeders

GENERAL PURPOSE
5TH WHEEL TYPE WAGON
with Rocking Bolster Principle
Will not whip at high speeds

Wood Steel Clad Feeders



Built to take the bumps.

Hog Troughs

Please send me your Free Illustrated booklets showing the complete Farmer Feeder Farm Equipment Line.

NAME_____

ADDRESS_____

CITY_____ STATE_____

FARMER FEEDER
Company, Incorporated
CAMBRIDGE CITY, INDIANA

A Book of Combines

Dear Sir:

This letter is to tell you how much I appreciate your story on combines, and I know 'em, particularly the old horse drawn contraptions up in the Walla Walla country, Washington. How rich the country was with rattlesnakes. Wish you would enlarge the story to a book, and put me down for the first copy. Don't leave out the fact that the driver of a 30-horse hitch carried a sack of pebbles and he could liven up any lagging horse. The story of the combine and the enterprise of the men that built them is one of the most interesting chapters in the history of America.

Walter Jack

Erie, Pa.

What Is a Freemartin?

Sir:

We have a problem and wonder if you can help us. We have twin male calves, born a couple of days ago, and have been told they would not be fertile. Can you tell me if there is any truth to the saying, the male twin is always sterile.

Roger Shelton

Okmulgee, Okla.

Your informant is confused. Twin male calves and twin female calves have just as much chance of being fertile as a single-born animal. It is when the twins are male *and* female that sterility comes into the picture. The female of a mixed pair of twins is called a freemartin and, in 95 per cent of recorded cases, is sterile. The most popular theory advanced to explain this phenomenon is that the female calf, during fetal development, receives large quantities of the male hormone from her developing brother through fused blood vessels in the two placentae. This hormone inhibits the development of her female organs and she becomes, internally, an hermaphrodite though externally she appears to be a female. So far as it is known freemartins occur only in cattle. Ed.

Cruel and Unusual

Dear Sir:

I wish to call to your notice advice given in the article "It's the Law", by Renzo Dee Bowers in the Spring, 1949 *Farm Quarterly*. It was difficult for me to believe my eyes when I read above the second picture illustrating this article: "A squirt of ammonia from a toy water pistol cures most dogs of chasing cars." Nothing is said about diluting this ammonia. It is to be presumed that it would be used full strength.

I wonder if the writer of that article and the editors who have published it have ever seen a dog after he has had ammonia squirted at him? We had a case recently here in Indianapolis, where my daughter and I have been concerned with dogs for many years. A boy squirted ammonia at a dog and it got in the animal's eyes. The affair aroused considerable feeling here. My daughter and I took the dog to a veterinarian, who said it was a wonder that the animal did not lose its sight. Fortunately a woman in the neighborhood had washed out the eyes as soon as

13 YEARS OF *Success*

RYE BROTHERS, AVALON, WISCONSIN... REPORT ON 13 YEARS OF GOOD BREEDING, GOOD MANAGEMENT AND WAYNE FEEDS

Many years ago, brothers C. L. and Theodore Rye founded the "Rye Brothers" herd, destined for fame in the livestock world. Their sons Ralph (right), George and Ted are carrying on with outstanding success. Early in 1936, they purchased from Charles Maas, Evansville, Wisconsin, a 4-month old, 185 lb. Poland China fall boar, followed Mr. Maas' recommendation of the Wayne Feeding Program—and, in Ralph Rye's words . . . "we liked the program so well that thru the years we have been users and boosters for other Wayne Feeds as well. Some of them we have used with much success are Wayne Pig Starter; Sow & Pig Supplement; Hog Supplement; Calf Starter; Calf Pellets; Sweet Mix Meal for our young stock; Sweet Mix Pellets for our Show Herd; Chick Starter; Growing Mash; and Wayne 26% Mash Supplement mixed with our own grains for our laying flocks. *They have all done a fine job for us.*

"We are very proud of our Show Winners and list of Show Winnings, and are glad to pay tribute to the part Wayne Feeds have had in our livestock operations these many years."

$2,100—$1,225—$1,250—$1,100

Med Maxwell, of the well-known Wayne Feeds "Let's Go Visiting" radio program, admires Wachusett Palermo, sire of most of Rye Brothers' winning cows. At one sale, Rye Brothers offered 15 head, topped the sale with a pair of twin heifers at $2,100 each. One Rye bull brought $1,225, a heifer $1,250 and a 3 yr. old $1,100.

1948 SHOW WINNINGS ON MILKING SHORTHORNS

WISC. STATE FAIR

1st Aged Bull
Grand Champion Bull
2nd—2 Yr. Old Bull
2nd—Sr. Yearling Bull
3rd—Bull Calf
3rd—Aged Cow
1st & 4th
3 or 4 Yr. Old Cow
1st & 4th
2 Yr. Old Heifer in Milk
3rd & 4th
Sr. Yearling Heifers
3rd & 7th
Jr. Yearling Heifers
3rd—Heifer Calf
2nd—Dry Record of Merit Cow
1st—Trio of Cows
1st Pair of Cows
1st—Get of Sire
1st—Steer (Milking Shorthorn)

DALLAS, TEXAS SHOW (With 6 Head)

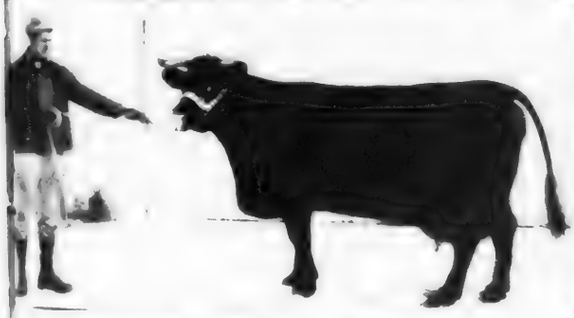
2nd—Aged Bull
2nd—Dry Record of Merit Cow
2nd & 7th
3 Yr. Old Cows
4th—2 Yr. Old Heifer

MINN. STATE FAIR

3rd—Aged Bull
1st—2 Yr. Old Cow in Milk
1st—3 Yr. Old Cow in Milk
2nd—Sr. Yearling Heifer
1st—Trio of Cows
1st—Steer
2nd—Dry Record of Merit Cow

WATERLOO DAIRY CATTLE CONGRESS

4th—Aged Bull
5th—2 Yr. Old Bull
1st—Sr. Yearling Bull
1st—Sr. Calf
3rd—Aged Cow
1st—3 Yr. Old Cow
3rd—Sr. Yearling Heifer
1st—Trio of Cows
3rd—2 Yr. Old Cows
3rd—Trio of Cows
2nd & 5th Pair of Cows
1st—Graded Herd
2nd—Get of Sire
2nd—Pair of Calves
4th—Yearling Herd



15,023 LBS. MILK—621 LBS. BUTTERFAT

14 year old Elmhurst Red Lady 3rd, with a 5 yr. old record of 15,023 lbs. milk, 621 lbs. butterfat. The trio of cows above her picture won 1st Prize at Waterloo Dairy Cattle Congress, 3rd cow was Jr. Champion at 1947 National Show at K. C. Their average production as 2 yr. olds—8,572 lbs. milk—337 lbs. butterfat. Two of these cows will make over 400 lbs. butterfat each this year—proving *production* as well as show qualities.

18 LITTER AVERAGE—8.2 PIGS

Rye Bros. breed, manage and feed for big, strong litters and fast, low-cost gains, as proved by this 8.2 pigs per litter average . . . and their production of 100 lbs. pork with only 4¼ bushels ear corn, 68½ lbs. Midds and 40½ lbs. Wayne Hog Supplement. "We always buy the best boars we can", says Ralph Rye. "In 1947 we bought Prospect Ace for $485, the highest-priced Poland boar in Wisc. that year. He was the highest index pig from the highest index litter of the Charles Maas herd."

Prove to yourself... IT PAYS TO FEED THE WAYNE WAY!

Rye Brothers' years of success are a tribute to *quality* breeding, feeding and management. You, too, can profit—in show-ring or feed-lot—by feeding the Wayne Way. See your friendly Wayne Feed Dealer now—or send coupon below.

Allied Mills, Inc., Ft. Wayne 1, Indiana
Send free feeding information on:

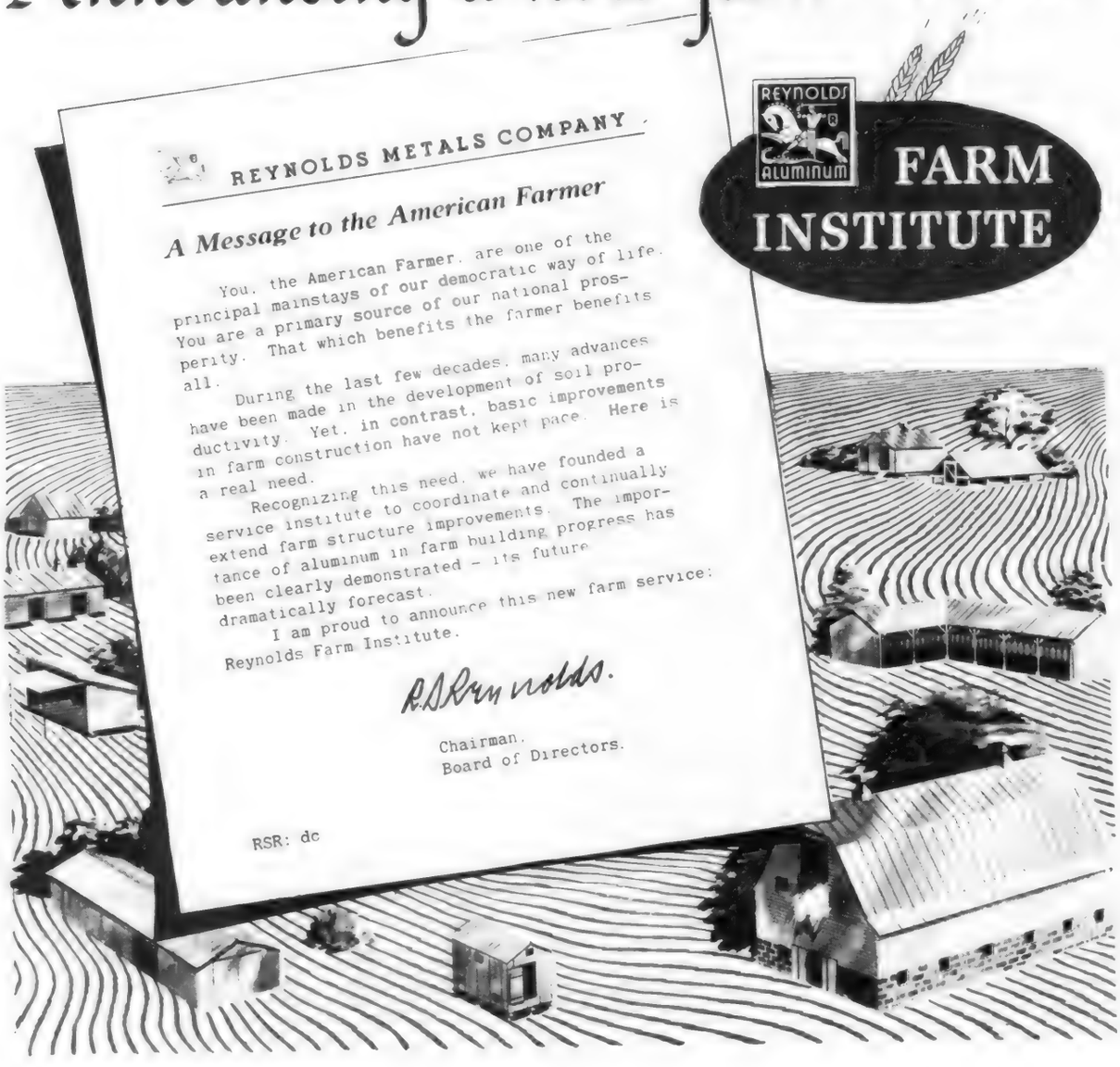
Chickens ☐ Turkeys ☐ Calves ☐
Hogs ☐ Dairy Cows ☐ Beef Cattle ☐
☐ (other)

Name .....
Address .....
Town ..... State .....

Back of every successful livestock enterprise is a sound feeding program

WAYNE FEEDS

Announcing a new farm service


REYNOLDS METALS COMPANY
A Message to the American Farmer
You, the American Farmer, are one of the principal mainstays of our democratic way of life. You are a primary source of our national prosperity. That which benefits the farmer benefits all.
During the last few decades, many advances have been made in the development of soil productivity. Yet, in contrast, basic improvements in farm construction have not kept pace. Here is a real need.
Recognizing this need, we have founded a service institute to coordinate and continually extend farm structure improvements. The importance of aluminum in farm building progress has been clearly demonstrated – its future dramatically forecast.
I am proud to announce this new farm service: Reynolds Farm Institute.
R. S. Reynolds
Chairman,
Board of Directors.
RSR: dc
REYNOLDS ALUMINUM
FARM INSTITUTE

The story of Aluminum on the Farm has gone beyond any normal company activity. Research centers from Maryland to California are extending their tests—proving that aluminum roofing reduces hot-weather poultry losses; setting up to prove how much aluminum will increase summer milk production, how much more weight it can put on fattening livestock. And each passing year adds proof of aluminum's rustproof permanence, without protective painting.

Meanwhile, the U. S. Department of Agriculture continues its excellent advisory service on farm building—supplying detailed construction plans for almost any type of structure.

At this point, a unifying agency is needed—to correlate aluminum test results and building plans, to advise specifically on aluminum applications, to stimulate new research in fields yet untried.

That is the purpose of the Reynolds Farm Institute.

As a first example of its service, the Institute has *ready now* "Aluminum Adaptor Plans" which will show you how to use aluminum building materials with any standard USDA plan. Please send for your *free* set of these Adaptor Plans...a coupon is appended for your convenience.
Reynolds Farm Institute, Louisville 1, Kentucky.

REYNOLDS METALS COMPANY

Reynolds Farm Institute, 2027 S. Ninth St., Louisville 1, Kentucky
Please send me a free set of "Aluminum Adaptor Plans" to use with USDA drawings.

Name.

Address

a great *New* general-purpose tractor joins the John Deere family

THE *Two-Row* MODEL *"MT"*

Meet the new 1-2 plow, two-row John Deere Model "MT" . . . the modern, tricycle-type John Deere that fits right in between the one-row Model "M" and the full 2-plow Model "B." In capacity, in power, in price, the "MT" is tailored to the needs of small general farms and vegetable farms. It handles all the lighter jobs on large farms with outstanding economy.

When you see it . . . drive it . . . you'll find that it offers extra value in all the features you want in *your* row-crop tractor.

First, here is new ease of handling with the new dual Touch-o-matic hydraulic control, vision that's unexcelled, four forward speeds, individual disk-type brakes, Self-starter, adjustable air-cushion seat, adjustable steering wheel, and ample standing platform bring you operator's comfort and convenience you'll really appreciate.

Here is the adaptability you want, with rear wheel adjustments for any tread from 48 inches to 96 inches; your choice of front wheels—regular dual, single, or adjustable wide front axle.

Servicing is a snap. No grease-gun is needed. Hood and grille are removed in 3 minutes for engine inspection.

With all its modern advancements, the "MT" retains the fundamental principles that have made John Deere tractors so successful down through the years—simplicity, quality of materials and workmanship, extra weight, strength, and "lugging" power, to mention just a few.

New Quik-Tatch working tools include 2-row cultivator, 2-row planting and fertilizing attachments, multi-row vegetable cultivator, 2-bottom bedder-middlebreaker, 1- and 2-bottom plows, field cultivator, disk tiller, and many others. Power take-off is regular equipment. Belt pulley and electric lights are available as extras.

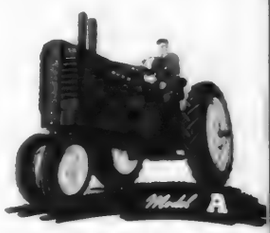
Ask your John Deere dealer for a demonstration. Write to John Deere, Moline, Illinois, for free literature.

DUAL TOUCH-O-MATIC CONTROL

The left and right control levers may be operated individually or together. One cultivator gang can be raised, another left in ground to finish out point rows. Control stop assures that implement will always return to same working depth.

Model "M" — One row general-purpose tractor for the smaller farms. Next step up for larger farms.

Model "B"—Full 2-plow power for medium-sized farms. Choice of gasoline or all-fuel engine.



Model "A"—2-3-plow power for large row crop farms. Choice of gasoline or all-fuel engine.

Model "G" — 3-plow power for large row-crop farms. All-fuel engine.

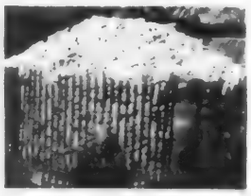
JOHN DEERE *two-cylinder* TRACTORS

FIRST IN MODERN DESIGN AND PROVED PERFORMANCE

sets the official pattern for seed corn performance

Ohio Certified Hybrid Seed Corn for Maximum "STANDABILITY"

Ohio Certified Hybrid Seed Corn for Maximum "HUSKABILITY"



Ohio Certified Hybrid Seed Corn for Maximum "YIELDABILITY"

WHEREVER YOU FARM IN OHIO and no matter how high your seed standards — you'll find the closest-to-perfect solution to your corn planting problems in Ohio Certified Hybrid Seed Corn.

THAT'S OFFICIAL . . . because *only* those hybrids *officially proved* best adapted for your area are eligible for Ohio Certification. Their superiority to other varieties has been solidly established by continuous, exhaustive tests. They are grown under the constant supervision of the Ohio Seed Improvement Association — *official* seed certifying agency for the state. Their purity and all-round quality are carefully checked and double-checked, both in the field and in the laboratory, by exacting and unbiased seed experts. That's why there's no other seed corn "just as good" for Ohio farmers. It has to be BEST to be CERTIFIED!

IF YOUR FARM is in or near Ohio, your local Ohio Certified Seed dealer is always glad to advise you on what seed corn to plant for top results on *your* farm. See him soon — and always insist on seed in the bag with the OHIO CERTIFIED tag. Its performance is *proved* . . . not just promised!

Ohio Farmers plant more Ohio Certified Hybrids than all other Hybrids combined

mail coupon for free printed literature

OHIO HYBRID SEED CORN PRODUCERS
Dept. P, Croton, Ohio

Send free illustrated literature on Ohio Certified Seed to

Name_____

Town_____ County_____

State_____

this happened, but even so there was much inflammation and the doctor washed the eyes more and applied ointments.

I am sure that, never in the world, would any good veterinarian advise using ammonia about an animal, because they know the consequences. There are other harmless ways of breaking dogs of running out at cars. They tell me that often just plain water in a water pistol, which may be aimed at the dog's face, will do this.

Mrs. William Allen Wood

Indianapolis 5, Ind.

The ammonia should be diluted. Ed.

Is This a Record?

Dear Sirs:

Enclosed herewith are pictures of two truly great Hampshire sows, Mt. Ararat Bright Beauty, PR 116, 3 Star, and Mt. Ararat Brilliant Beauty, PR 164, 5 Star sow. These pictures were taken in October 1948, just as these two little sisters were weaning their 11th litter.

Bright Beauty and Brilliant Beauty

These famed sisters have produced 109 and 120 pigs respectively in their 11th litter. In addition to 5 daughters and 2 sons now in Mt. Ararat Farms herd, we have sold from these two sows $16,290.10 of their direct product.

We have never heard of any record to approach this.

Vere S. Culver
Mt. Ararat Farms

Port Deposit, Maryland

It Skipped Lightly

Dear Sir:

The up-dating of the article on cross-breeding of dairy cattle (Summer 1947 issue) which appears in the Spring 1949 issue seems to me to skip very lightly over a subject of profound significance to the dairyman.

I am writing this because I feel that your original article stated the case for cross-breeding very adequately and gave sufficient space to the question to make the problem intelligible. Your up-dating article, I thought, sacrificed accuracy for brevity.

At the same time, it seems obvious that the Bureau of Dairy Industry, USDA, has been very slow in publishing its material on this experiment, and has to date failed to gather a complete compendium on all aspects of its work.

The purebred industry has perhaps not yet sufficiently recovered from the shattering impact of the BDI's first broadside to permit it to absorb the subsequent findings of this experiment, nor to speculate intelligently on its implications. I have devoted a great deal of thought to this subject during the past six months, and have arrived at no clear-cut conclusions except one—that the cross-breeding experiment is the most important single development in the dairy industry since the invention of the milking machine, and readily ranks with the discovery of hybrid corn.

I have studied every herd in which straight-bred and crosses are milked side by side in this vicinity that I know of, and have *invariably* found that where identification was reasonably reliable, the crosses outmilk the average of straight-bred animals, in the same herd.

Since last November, I have been cross-breeding my herd of about 80 purebred Ayrshires. My fellow-breeders think I have lost my mind, in spite of the mounting evidence. I have concluded, after the most careful thought, that they have not yet found theirs.

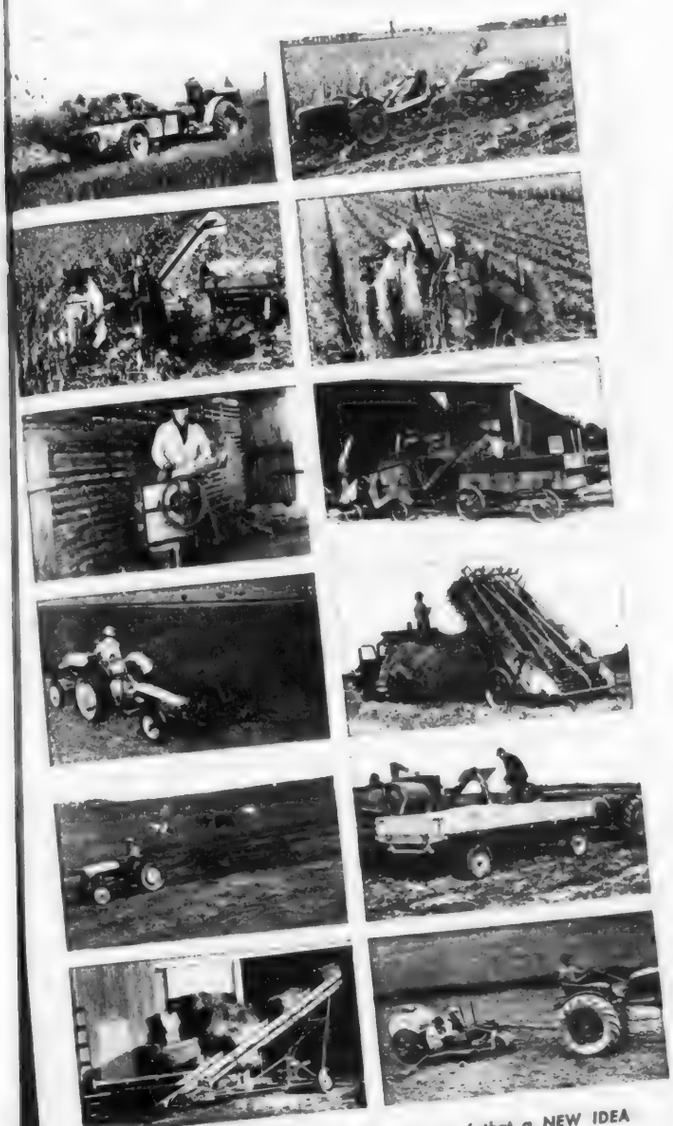
Robert R. Hare

Millington, Maryland

if it's a

NEW IDEA

it's a good idea



The right man to give you positive proof that a NEW IDEA is a good idea . . . in every way the best idea . . . is your NEW IDEA dealer. See him soon. Mail coupon today.

every machine matched to the job

Your equipment dollars never work harder and longer for you than when invested in NEW IDEA Farm Machines. That's a broad statement — but no broader than the savings you're guaranteed by overwhelming performance records.

Owners by the thousands can tell you these facts about their NEW IDEA Machines . . .

TIME-SAVING. Each is quickly readied for action. Fast and efficient in operation. Reliable under hardest service, yet requires least attention or maintenance. You don't waste a minute with any NEW IDEA.

WORK-SAVING. Every machine is easily hitched and unhitched. All controls are convenient and smoothly responsive. All adjustments are simple and speedy. You use far less effort with a NEW IDEA.

MONEY-SAVING. Biggest dollar-for-dollar values on every count. Finest materials. Carefully supervised workmanship. Rugged, oversize working parts are precision-fitted and fully protected. Greater work capacity cuts job costs to the core. You can bank on longest service life and lowest operating expense with a NEW IDEA.

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Dept. 514, Coldwater, Ohio

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ADDRESS_____

Farming is the noblest of all the arts. Take pride in it.
NEW IDEA DIVISION AVCO MANUFACTURING CORPORATION
FIFTY YEARS OF SERVING 1899 - 1949
NEW IDEA Farm Equipment
AMERICAN AGRICULTURE

You Can Save On Farm Building Costs with BUTLER Steel Buildings

DAIRY BARN — Plenty of space in Butler Buildings to install complete equipment for a modern, well-ventilated, up-to-date milking parlor.

HORSE BARN—Fire-safe...Well-ventilated. Note many modifications including extended roof for sheltering while grooming.

HAY & GRAIN STORAGE—A dual-purpose Butler Building with one end closed and partitioned off for bulk grain storage . . . the other end open for sheltering hay or livestock.

IMPLEMENT SHELTER & TOOL SHOP — Safe, weathertight protection for expensive farm implements and equipment. Plenty of room for tool shop and repair facilities, too.

Easily Adaptable to All types of Farm Buildings

Make permanent farm improvements now—*and save up to 50% on costs*—with Butler Steel Buildings.

You can use these adaptable, low-cost buildings for any farm purpose. No maintenance or painting is necessary. Rodents and termites can't damage them. You have a permanent, all-metal building that lasts for years. Easily insulated if your needs require it.

See how quickly, easily and economically you can have a Butler Building erected to meet your farm building needs. Mail coupon today for complete information.

BUTLER
Steel Buildings

The Mark of BUTLER *Better Quality*

BUTLER MANUFACTURING COMPANY

Kansas City, Mo. **Galesburg, Ill.** **Richmond, Calif.** **Minneapolis, Minn.**

Please send information on Butler Buildings:

- ☐ 50 Ft. Width
- ☐ 40 Ft. Width
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For Prompt Reply, Address:
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978HH Sixth Ave., S. E., Minneapolis, Minn.
Dept. TTT, Shipyard No. 2, P. O. Box 1072, Richmond, Calif.

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P.O. _____ R.F.D. _____

STATE _____

THE FARM'S PICTURES

Cover by: John Strohm

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It was in 1842 — the year that our business was founded — that the French Academy of Sciences published a report of the experiments made by Dr. Charles Etienne Jacques Chossat at Geneva, Switzerland. Using pigeons, he established the need for calcium in building bone structure and maintaining life and vigor.

Across the seas — through the years —

CHOSSAT'S PIGEONS BRING YOU PROFITS

TODAY it is universally recognized that profitable feeding of poultry and livestock demands applied knowledge of the requirements and functions of many important minerals.

BUT IT WAS NOT ALWAYS SO. Until Chossat's report of his long and persistent experiments with pigeons was published 107 years ago, scientific men of that time had groped fruitlessly for proof of the importance of minerals in nutrition. Chossat pioneered in a new method of research. To some pigeons he fed wheat only—they died within 8 to 10 months as a result of calcium deficiency, whereas this was "prevented by the addition of a little calcium carbonate." Other pigeons receiving the calcium carbonate from the beginning had strong, normal, bone structure. Although this is only one of many important mineral discoveries made by science, Chossat's experiments eventually PROFITED EVERY FARMER USING A BALANCED RATION.

In Chossat's day scientific feeding was practically unknown, and his important contribution was not immediately put to use, as it would be today. SCIENTIFIC RESEARCH FAILS TO ACHIEVE ITS PURPOSE UNLESS IT IS APPLIED. Recognizing this, we try at all times to keep pace with the latest research on minerals, vitamins, protein factors, and other animal feeding essentials by constant experimentation at the Red Rose Experimental Farms. Research which proves to be economically profitable for the farmer is then incorporated in Red Rose Feeds.

If you are at present a farmer, a future farmer, a member of 4H or FFA, and are interested in better feeding of farm animals, you will find our booklet on the story of minerals and vitamins a valuable asset. Send the coupon below to our office today. Learn how and why minerals, vitamins, and other essentials are used in Red Rose Feeds for poultry, livestock, and dogs. Then, like thousands of successful feeders from Maine to Florida, use Red Rose for profitable results.

Important!

Send coupon to

JOHN W. ESHELMAN & SONS, Dept. 1,
LANCASTER, PA.

for a free booklet on the story of minerals and vitamins —"Essential Nutrients In Animal Feeding."

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LANCASTER, PA.

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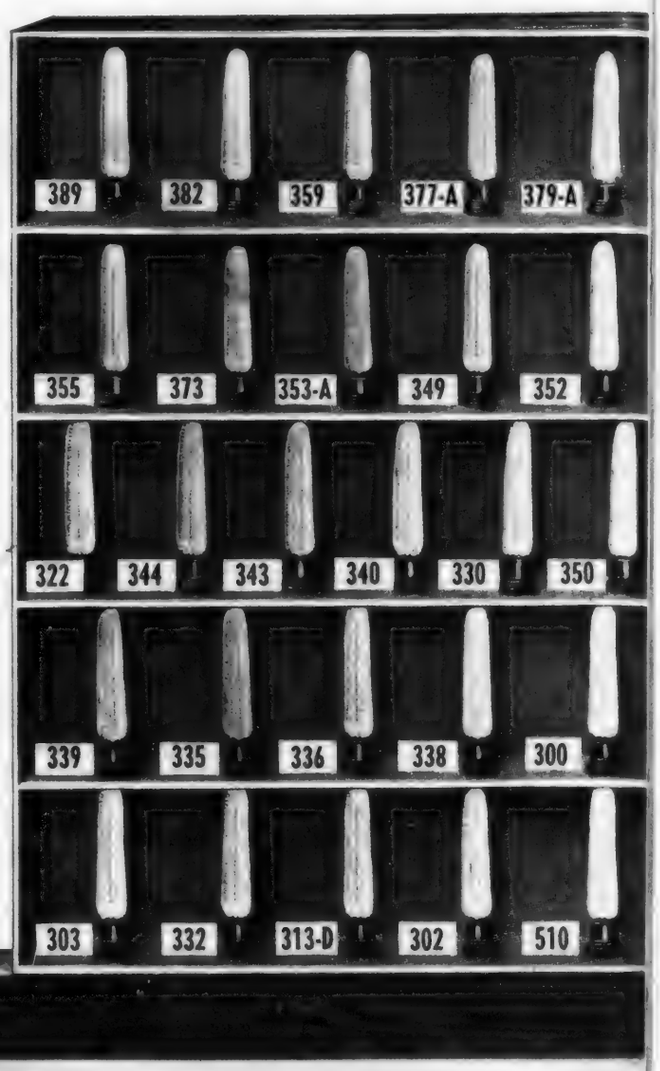
Eshelman RED ROSE GUARANTEED FEEDS

"Cream of the Crop" Hybrids. . . .

THE BEST of 10,000 TESTED HYBRIDS



. . . Result of PIONEER RESEARCH for *Better and Better Corn*

Cornbelt farmers have a choice of 55 top-notch Pioneer hybrids (26 of which are shown above) . . . selected from over 10,000 experimental Pioneer hybrids bred and tested during the last 10 years. These are the "cream of the crop" of hybrids developed by Pioneer research for better and better corn. They offer about any type and maturity of corn . . . and corn for nearly every purpose. Pioneer hybrids are dependable and profitable. They are bred, handled and treated to grow . . . even in cold wet soil. They give fine stands, big yields, and the kind of ears farmers like.

PIONEER Breeds Better and Better Hybrids

Pioneer corn breeders carry on a large, well-balanced corn breeding program. They have conducted their research for better and better corn since 1913. They have since developed hundreds of pure Pioneer inbreds. They use dozens of these Pioneer inbreds in their hybrids. For 1950 planting Pioneer corn breeders offer cornbelt farmers 50 commercial hybrids which they developed and are not produced by anyone else. Next spring plant "cream of the crop" Pioneer hybrids. Ask your Pioneer salesman about them—and place your order now.

MAKE IT ALL PIONEER NEXT YEAR

The Dairy Barn

A BRIEF SUMMARY OF THE NEWEST DEVELOPMENTS IN DAIRYING AND THE CARE OF DAIRY CATTLE.

Feed Cows Sawdust One of the more interesting discoveries recently announced by the scientists is a method of turning sawdust into cow feed.

The waste wood is turned into feed molasses, which is said to be a low cost, high energy cow feed. The Forest Products Laboratory, of the U.S. Forest Service, a branch of USDA, is working out the fine points. The wood molasses has been produced in sufficient quantity to permit several agricultural experiment stations to test its value.

To convert sawdust into molasses, the wood waste is first treated with an acid to make a weak solution of sugar. The excess water is then evaporated until the molasses is 50 per cent sugar.

Montana research men have used wood molasses in the manufacture of mixed feeds, and mixed feed pellets, for supplemental feed for cattle and sheep on winter range. They have succeeded in substituting wood molasses for one-sixth of the grain ration of lambs.

One farmer who tried a 30 per cent mixture of oak molasses with cottonseed meal and hulls found that adult cattle ate the mixture readily. Calves, however, would not eat feed so rich in molasses.

Tractor Powers Milker Last year when a sleet storm broke power wires, J. E. Coplan, who operates a dairy farm north of Carlock, Illinois, hand milked his 26 Brown Swiss cows for 10 days. It takes 200 minutes to hand milk the herd and only 75 minutes with his two milking machines. The loss in time cut into Coplan's work day.

Coplan began to wonder if there was some way to power his milking machines should such an emergency arise again. Somewhere along the line he heard that the suction of a tractor intake manifold could be substituted for the electric pump that creates the vacuum in the barn pipes of the milking machine.

Then, in January of 1949 the power failed again and Coplan had a chance to try his tractor on the milking machines.

Coplan had an extra valve similar to the valve used on the barn pipes of the milker. He bored a ¼-inch hole in the intake manifold and screwed this valve into the hole. He attached a half-inch vacuum milker hose 12 feet long to the valve. The other end of the hose was attached to the first stall cock in the pipe line.

a *flick* of the switch...

YOUR BARN IS CLEANED

with the CLAY ELECTRIC Barn Cleaner

In 5 to 10 minutes, manure is in the spreader —gutters cleaner than with hand shoveling.

This amazing Clay "Magic Shoveler" revolutionizes barn cleaning methods with these important benefits for you:

• Helps keep better dairy labor on your farm.

Eliminates "back-breaking" dirty chore—no need to lift a shovel. Saves time for other work.

• Quick, easy, low-cost.

Cleaning time for 30-cow barn about 8 minutes! Easily installed in new or old barns. Only one motor, one continuous chain, no pit required.

• Take pride in cleaner, more efficient barn.

Bedding that falls in gutter acts as a broom, leaving gutter cleaner than with shoveling. No manure scattered on litter alley.

• No foul-smelling pit, less odor at cleaning time.

Doesn't turn manure during cleaning. Carries directly to spreader outside.
Low in cost—simple to install—full guarantee backed by 50 years of quality equipment experience. Fill out coupon below for detailed bulletin about this easy, labor-saving way to clean your barn.

Chute and motor cover shown as paddles push manure up chute and into spreader.

CLAY Equipment Corp., 949 Fulton St., Cedar Falls, Iowa

Also complete barn equipment . . . windows, stalls, stanchions, pens, water bowls, gates, etc. Write us regarding your requirements for dairy barn, hog or poultry houses.

Please send detailed Barn Cleaner Bulletin.
Number of stalls in my barn_____
Name_____
Post Office_____ Box No._____
Route_____ Township_____

With the tractor motor idling the two milking machines worked perfectly. The vacuum gauge on the pipe line showed the same reading as when run by the electric pump, and the herd was milked in the usual 75 minutes.

Although Coplan is not the first farmer to hitch his milking machine to a tractor, we pass the suggestion along for the benefit of those for whom it might be news.

—Harry Spooner

"X" Disease There is a mysterious disease going the rounds of the cattle industry. Because scientists still don't know what the disease is they call it "X". In this case "X" marks the spot where there are still a lot of unanswered questions. About all we know about X Disease to date is that it kills more than half the cattle it attacks.

The disease has already cropped up in at least 32 states. It is a relative newcomer to the cattle industry, but one which has already proved its ability as a killer.

Late in 1948 the USDA sent a group of four scientists scouting about the farms of several Southern states where the outbreak of X seems to be the most serious. They studied 26 herds in 20 counties. These affected herds normally contained 4,120 cattle. Thirty-one per cent of the animals had been attacked by the disease.

The mysterious X attacks only cattle and seems to favor beef animals over dairy animals in the proportion of nine to one, and young animals are more susceptible than grown stock.

The cause of the disease is no less baffling than its origin. Some veterinarians believe the cause may be nutritional, but they can't prove it. It usually runs its course in one to three months.

This Jersey heifer has "X Disease"

Early symptoms include watery discharge from the eyes and nose. Next, the suffering animal goes off its feed, and begins to lose condition. The skin begins to thicken, which is the symptom responsible for the name, hyperkeratosis, which is the name veterinarians sometimes use for the ailment. In the late stages the animal may suffer from diarrhea.

No cure or treatment for X disease has been found, primarily due to the fact that the cause of the disease is still a mystery. The dairy and beef scientists suggest that, as a safeguard, cattle suspected of having the disease be isolated from other stock. This may or may not be necessary, since there is still no proof it is contagious.

Dehorn With Electricity Since man first took the cow out of the bushes and domesticated her, he has been figuring out new ways to remove her dangerous and unnecessary horns. From sawing and clipping them the farmer went to the application of caustic chemicals. The latest development in the battle of the horn is the use of electricity to kill them when the calves are still young.

A tool somewhat like a soldering iron is applied to the horn buttons. Dehorning a calf requires only two and a half minutes. The electric method is less time consuming, and less painful than the caustic, and completely bloodless.

The electric dehorner was developed in the South Carolina Experiment Station's Dairy Department. It proved so successful in first tests that during 1949 all the calves in the Station's dairy herd were given the electrical treatment.

With this experimental information to guide them a national electrical manufacturing firm is now busy turning out electrical dehorning kits. There are three interchangeable heads for the soldering iron which comes in the kit. One small head is designed for dehorning calves up to one month of age; another is for calves from one to two months old; and the third is for calves from two to three months.

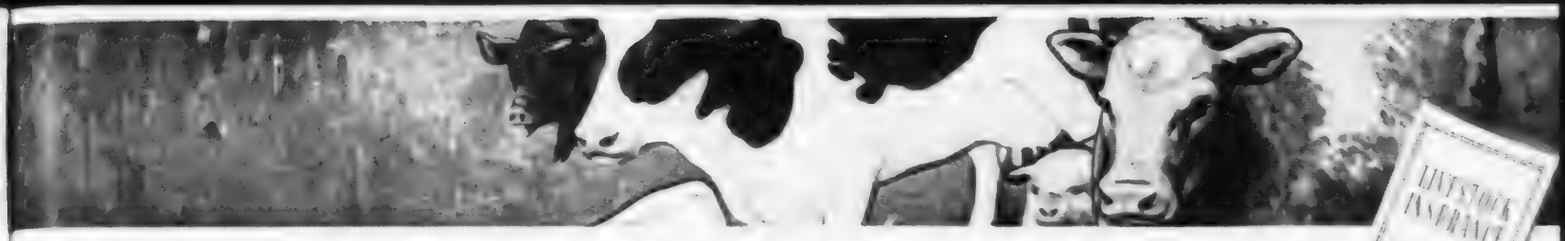
Easy does it... with a new DANDY BOY

HERE'S what you've been waiting for! Select one of the *new* Dandy Boys —the Clipper, the Town & Country or the big Imperial. Three completely new garden tractors . . . designed for your easy operating . . . built to do the job. They'll make play out of your lawn and garden work!

These Dandy Boys have powerful, easy-starting engines . . . balanced on sturdy, steel tubular frames. Hand wheel adjusts handles instantly to height of operator. Powerful 3-speed drive . . . with non-chattering clutch for smooth starts at each speed — 1, 2½ and 5 miles per hour. Ratchet wheel-clutches make short turns easy. Quick-change hitches fit complete line of attachments.

See your Dandy Boy dealer for complete information on all three *new* tractors . . . or write to the Midland Co., South Milwaukee, Wis. Get all the facts . . . you'll agree that the new Dandy Boys are the finest garden tractors on the market.

THE MIDLAND CO
SOUTH MILWAUKEE, WISCONSIN

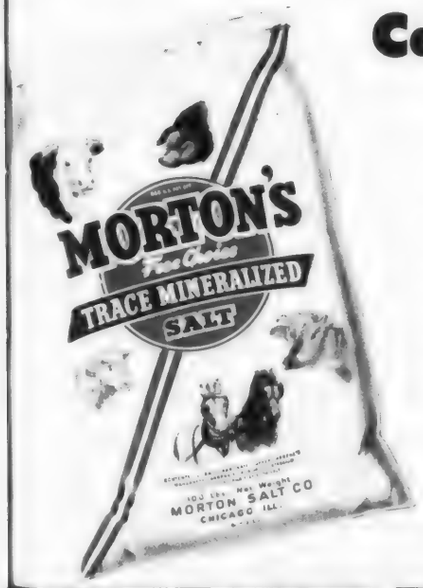


TRACE MINERALIZED SALT

Is Like a Low-Cost Insurance Policy Covering Your Livestock

A Few Cents for MORTON'S Trace Mineralized Salt

Can Mean Dollars of Extra Profit for You



Ordinarily, Nature's way is to feed trace minerals through the grasses, hay, grains and other feeds that animals eat. But because of heavy cropping of land; sheet wind, and gulley erosion, much of the trace minerals have been lost.

Trace mineral deficiencies are evident even in the better areas. If not wholly apparent, they exist in terms of slower gains, higher feeding costs, less milk, and fewer, less vigorous young.

This is easy to understand. Trace minerals — cobalt, iron, copper, manganese, and iodine — are vital to the entire enzyme, hormone, and vitamin activities of the body — the basic life functions.

Authorities agree that salt is the ideal carrier for trace minerals. Like the instruments of an orchestra, salt, the one universally needed major mineral, and trace minerals blend together for one beneficial effect — health, growth, reproduction. In other words they mean more profits.

Moreover, the need for salt is usually in relation to the amount and kind of feed an animal eats. With salt, fed free choice, there is a regular, constant intake — neither too much nor too little.

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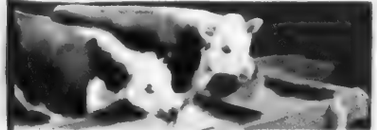

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LIVESTOCK NEED IODINE — Iodine is needed for the hormone, thyroxin, in the thyroid gland which controls all body activities. Healthy thyroids help assure healthy, thrifty, vigorous—and profitable animals.

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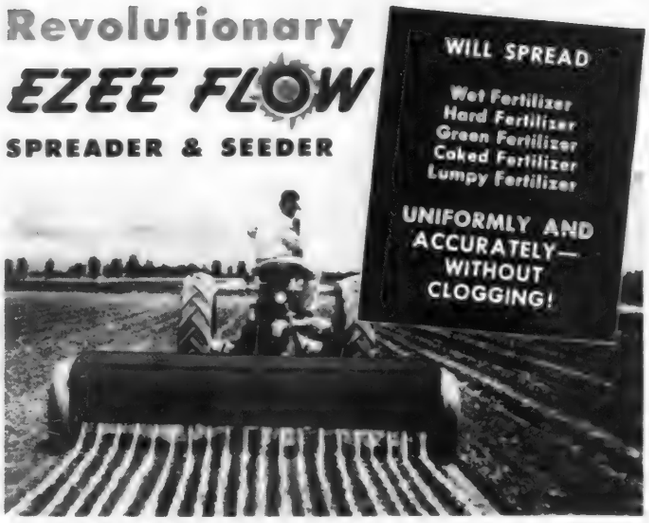

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FARM BOOKS

Grassland Farming

Front Porch Farmer by Channing Cope
Turner E. Smith & Co., Atlanta, Georgia: $2.75

From his pictures you would gather that Channing Cope is a big, lazy fellow who would rather sit around in a reinforced easy chair and yarn than get out and do a good day's work. His book assures you that this is exactly the way he wants to live. The dawn-to-dusk hustler who makes every daylight minute count, he characterizes as a drudge-farmer. But Cope has two other ambitions, besides living a lazy life: he wants to improve the land, and he insists on his farm producing a living for himself and family.

In his book *Front Porch Farmer* Cope tells the story of how he has achieved his three objectives on his 700 acre farm 40 miles southeast of Atlanta, Georgia. Essentially this is the story of the year-round grazing program of the South and the pasture crops that are necessary to accomplish it. As Cope expresses it, the plan is to weatherproof the pasture by planting grasses and legumes that can resist flood and drought, intense heat and bitter cold, and still produce forage for livestock throughout the year. It takes four different pasture crops to produce food for cattle in every season of the year: Cope describes them with the pleasure and warmth an old man might use in describing the friends of his youth. Kudzu, the miracle vine, he plants on his steepest hills to stop erosion, build up the land, and produce pasture from May to October. Sericea, he plants on the gentler slopes for grazing from April through October. On the flat lands where he may expect both flood and drought he plants Kentucky 31 Fescue mixed with the high protein legume, Ladino, to produce a winter pasture from November until the Sericea is growing in April.

Northern farmers are bound to be shocked by some of Cope's easy-going conclusions. It is hard, for instance, to imagine a corn belt farmer remaining calm as he reads, "One of the charms of front porch farming is that you are not trying to get a maximum out of the minimum at all times. For instance, if a crop grows to maturity and falls back upon the land because you cannot get hold of a combine or the weather interferes, do not let it get you down. The land can use the rotting material very nicely. The shock of being given something for nothing will not prove fatal to it".

Critics of Cope's methods will find that he has one answer that is very difficult to get around. He has made it work. When he bought his Yellow River farm in 1927 the county agent, looking over the rundown, eroded land, predicted that he would "perish to death". Today after 22 years of pasture and livestock farming, he is reported to net $11,000 a year from the place.

Efficiency on the Farm

Farm Work Simplification, by Lawrence M. Vaughn and Lowell S. Hardin
John Wiley & Sons, New York $2.80

Early in 1942, as the United States was getting into war, it became apparent that one of the problems we would face would be a manpower shortage on the farm. Though little could be done to prevent this shortage our experience in industry showed that a great deal could be done toward making better use of the time and effort of each worker. Funds were made available for the financing of the National Farm Work Simplification Project which was designed to study the problems of work simplification on the farm, and to make findings available to the farmer. The two authors of this book were actively engaged in the work of this project, Dr. Vaughn as Executive Secretary, and Dr. Hardin as Assistant Director. Though numerous pamphlets and news

(Continued on page 144)

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Allis-Chalmers introduces two new companion machines, a Forage Harvester and a Forage Blower. Operated by a full 2-plow tractor with power take-off, the Forage Harvester is actually three machines in one:

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Shown with corn attachment

FORAGE BLOWER

Matches the capacity of the Forage Harvester. Handles all forages from silage to long, chopped or wilted hay. Extra long lift-up conveyor raises vertically. Large capacity blower pipe.

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THE KOLO is a Slav folk dance. It is accompanied by an unjoyful dirge sung in a minor key and looks like an American college snake dance in slow motion. It is one of the few recreational outlets of the peasant and is often danced in the village street when the day's work is done.

ZADRUGA

By R. J. McGINNIS

Here is a first-hand report of life on a Yugoslav collective farm behind the Iron Curtain

IT WAS a fine morning in May, and from his high bed Josip Stanovich could see into his kitchen garden. The dawn was just breaking, and he could make out the rows of onions and radishes and the half-dozen bee-hives along the rear wall. Josip pulled up the blankets, exposing his feet, and for a long time thoughtfully regarded his great toe. He was a lucky fellow, he told himself.

There had been scarcely a morning during the four years since he had come to Lovcenac that he had not awakened with a feeling of good fortune. The memory of the winter hunger and the endless struggle which he had known in his native mountain home in Montenegro was still as real to him as though he had left it but yesterday. "If I were there now," he thought, "I should already have been out of bed two hours." There the bed was a pile of straw on which his wife, his mother, and his two children slept together under a single cover made of untanned sheepskins. It was in the same room where the family cooked and lived, and at night no one took off anything but his shoes. They had corn meal porridge with salt for breakfast. There was usually a brood of chickens or a lamb by the fireplace.

Josip heard his wife, Milica, moving about in the kitchen, and he thought of the good breakfast he would have. "Here I am, by a great stroke of good fortune, sleeping on a goose down bed, with all my clothes off except my underwear, and I shall have bread dipped in bacon fat for breakfast and some cheese if I want it. God has indeed been kind."

THIS FORMER HOME of a rich peasant farmer is now headquarters for a livestock unit of a collective farm. The Red Star is a late addition.

THIS MOSLEM BOY has driven a yoke of oxen from the hills with a load of firewood. His fine face is typical of the freedom-loving Moslem peasantry of Yugoslavia's southern mountain districts. Poverty is chronic in these rocky highlands.

Josip is a Montenegran, lean and tall like all of his race. He is only 45, but his face is lined and burned to a deep brown and he looks older. His wife is 35, and looks 60. Neither can read nor write. They had six children: two little girls at home, a boy 16 in a work brigade in Belgrade, a son killed by the Germans, and two dead in infancy.

He recalls that morning four years ago, soon after he had returned from the Liberation Army, when an officer had come to his mountain hut. He had sent the women and children up the path to hide among the rocks, for soldiers almost always were bearers of ill tidings. But this officer had been an angel in disguise. He had told Josip about the farms in the north, with rich fields and good houses, one of which might be his in trade for his whitewashed hut and two hectares of stony land.

"You are to bring what you can carry and be at the railway station in two days. You will have a house and two hectares of land and the State will see that your family is fed and clothed." Josip's women packed the religious pictures, their few dishes and a precious blanket and walked down the crooked mountain road to the railway station.

A few days later, with several hundred of their countrymen, they were in Lovcenac, 200 miles to the north. It was a new world for them. The land was almost flat, the fields looked rich and Josip could not see a single stone in them. The houses were like palaces, with red tile roofs, white-washed walls, and glass in the windows. Each had a little garden and a small stable, a pig sty, and many fruit trees. There were berries in the garden and stands of bees.

Josip's house had two rooms and a "summer kitchen." The floor was of hard packed clay, painted a brilliant yellow. There were three high beds with feather mattresses, a brick stove, some chairs, a table, and even some good iron cooking pots.

The Zadruga

The next day a young man called them all together in the church and told them about their new life. They were to work together for the good of the State and one another. This was to be a new and better Zadruga.

Josip is lucky, and he is much better off than he ever would have been had he remained in Montenegro, which has the lowest standard of living of any section of the country. He was moved from the poorest to the richest agricultural area, placed in a collective which is favored because it is a show window for foreigners. He is one of Yugoslavia's great population of have-nots, which under communism now have something. He is typical only of this class. Formerly well-to-do peasant farmers are not as happy as Josip.

Josip knew about the Zadruga. A mild

form of communal life, the Zadruga had grown out of the necessity of preventing the patrimonial division of tiny farms in the over-populated farm lands of Yugoslavia. The leader of the Zadruga, elected by the members, ruled the social and work life of the clan. A relic of the Middle Ages, it had survived in the mountain districts. The government capitalized on the peasants' acceptance of the Zadruga as a way of farm life and prefers that its socialized farms be known as Zadrugas rather than collectives, a distasteful Russian word.

The village of Lovcenac, a few miles north of Novi Sad in the rich Danube basin, had been occupied by German "colonists" whose ancestors had settled there during the Middle Ages. These thrifty peasants had tilled the good, rich soil of Vojvodina, and had added each year a little touch of better living. They had put floors in their houses, built high stone walls around their gardens, planted the apple and prune trees that shaded the courtyard. But in World War II they had become enemies of Yugoslavia by accident of birth. Many were suspected of dealing with the enemy. When the peace came, with bag and baggage (and very little of either one) they had been loaded into trucks and without ceremony dumped over the frontier and into their one-time native land. Their land and their houses went to Josip and his neighbors.

The Njegus collective, named for a great Serbian poet and bishop—ruler of Montenegro, in the village of Lovcenac, is one of the largest in Yugoslavia and one of the first to be organized. It includes 910 households, 5,000 hectares (12,000 acres), about 1,100 regular workers and about as many more women, boys and girls who are part-time workers. The people of Lovcenac are "colonists," having been brought in from the southern mountain districts. It has a total population of about 5,000. In topography and soil it closely resembles the Midwest.

Besides the village itself, which includes a few shops operated as free trading centers, the church and the school, the collective has 170 groups of farm buildings, most of them specialized, scattered about the 12,000 acres. Hogs are raised in one group, cattle in another, bees in another, garden vegetables in another, and others are centers for field crops.

Each morning Josip goes to the meeting place of his work brigade. The size of the brigade depends on the size of the collective and the type of work done by the brigade. The field brigades are the largest; brigades that work with stock and maintenance are the smallest. Josip belongs to a field brigade of 40 workers. Its leader is a brigadier who calls the roll, keeps a time sheet, directs the work, and sees that there is no loafing. Each brigade may be subdivided into groups, each group under a working foreman.

The brigadier does not work and is usually a Party member or a leader in the

Comrade Popivoda, president of Njegus farm.

Preferred stock, for milk, meat and power.

His special job is training Cossack horses.

Young love blooms, even under the Red Star.

A farmer's daughter tends the wheat drill.

Grandma improves the afternoon coffee hour.

The Germans overlooked this Simmental bull.

Glamour in the beet fields of Yugoslavia.

A pre-war Hungarian tractor, a favorite of Yugoslav farmers because it is powerful and simple. It has a top speed of three miles an hour, but can pull four plows. American tractors confuse the horse-conscious Slavs—they say they are complicated and too fast.

Peoples Front. Old soldiers in the brigade sometimes compare him to a top sergeant; behind his back, that is.

Josip's brigade is responsible for about 40 acres of winter wheat, 50 acres of corn, 60 acres of oats, 100 acres of potatoes and 20 acres of forage crops. The land under its care in the summer of 1949 was broken by tractor, but cultivating and harvesting were done by horses. Power machinery is operated by a separate brigade. By Western standards the brigade of 40 men turn out only a fraction of the production which is ordinarily done by the same number on an American farm. An American farm of the same size, (12,000 acres) the Jack Dunlap farm near Circleville, Ohio, (Farm Quarterly, Summer, 1949) employs about 140 men, including administrators and office workers. Njegus employs 1,100 full time workers exclusive of administrators. However, the latter has insufficient machinery, and although a great deal has been done to consolidate fields, many of the plots are small and there is much time lost in traveling from one plot to another during the day. The pace of work in a brigade tends to be set by the slower workers.

The Njegus collective has 30 tractors and several hundred horses and is better off than most collectives in other essential machinery, such as drills, harvesters, and cultivating plows. The smaller collectives do not own their own machinery, drawing it when available, from a machinery pool or station. When it is not available, primitive hand labor takes its place. The shovel and the hoe are still the chief farm tools of the country. Whole farms are tilled and harvested by hand.

UNRRA

UNRRA supplied Yugoslavia with the means of producing food when the need was greatest and there is extreme gratitude for this help. The bulk of the machinery, animals, and seeds came from America and the high quality of these manufactured goods, more than anything else, has stimulated the desire to trade with America.

A new member of the U. S. Embassy staff broke a tooth from his bridgework soon after he went to Belgrade and trustingly took it to a dentist for repair. He canvassed practically every dentist in the city before he found one with a spare tooth. "This is the last tooth I have of a lot which we received four years ago through UNRRA," the dentist said. "I think I can make it fit, but be careful. If you break another you'll find there isn't another spare tooth in all Yugoslavia."

There are not more than 10,000 tractors in the whole of Yugoslavia and of these 2,700 came in under UNRRA from the United States. Also under UNRRA 19,000 horses, 147 bulls, 3,817 heifers and 1,084 mules came from America; also 511 tons of hand farm tools, 42,000 tons of fertilizer, 5,600 tons of feed, 7,250 tons of pesticides, and 8,000 tons of seed. This came into the country between May, 1945, and May, 1947, and the impetus it gave agriculture is still plainly visible. Missouri mules which still remember "gee" and "haw" are common in Yugoslavia.

The Elusive Norm

Josip works eight to ten hours a day and during harvest may stretch this from a dawn-to-dusk day. When work presses the brigades have their noon and evening meals in a central dining room. Breakfast is always prepared at home. Meals are prepared by a brigade of women who leave their pre-school children in a nursery presided over by another brigade. During the slack season the workers may take their lunches, which have been prepared at home, to the fields with them.

What Josip receives for his day's work is based on an official "norm" or standard. The determination of the "norm" is the result of a complex mathematical exercise. It seems to be based somewhat on what the average man can do in a day. It is possible for a good worker to get more than one day's credit during the eight or ten hours he is working. Work done during the longer days of harvest almost always exceeds the norm. Unlike the celebrated Russian coal miner who turned out 14 times the norm during a single day, it is almost impossible for the Yugoslav to do more than 1.75 of the norm during a work day, which indicates that the norm is set rather high.

There is a constant effort to increase the production of each individual as well as the collective as a whole, and prizes and bonuses are offered for high production. The worker who sets a new record is feted by the Party Committee, but among the workers he is known as the Yugoslav equivalent of an eager beaver and is not always popular. Each new record has a tendency to increase the norm. The average farmer regards a "speed up" very much as an American union member who is told higher production will eventually

The Mongol pig is striped at birth showing close relationship to the wild pig of Asia.

result in a higher salary for him. He is frankly skeptical.

A worker may be penalized as well as rewarded. A loafer finds that his work credits reflect the speed of his work and if loafing becomes chronic he may have his ration coupons withheld or his vacation cut off, or he may even be expelled from the collective. He may be cited for a "negative" attitude and held up to scorn.

Josip does not know his wages until the end of the harvest each year. He may draw on his credit for supplies from time to time, but the production of the collective and the price it receives for stock and crops sold determines his final income, and this is computed only once each year.

After the government levies, the expenses of operation, the interest and rents, and a sum for capital improvement, have been taken out, the remainder is divided among the workers, each receiving a share proportional to his work credits. In the better collectives this may amount to as much as 200 dinars per work day. Of this amount about four-fifths will be paid in kind, the remainder in cash. Each worker may sell, where he pleases, the surplus of produce he receives over and above what his family uses, and thereby increase his cash income.

During the four years he has been a member of the collective Josip has received adequate supplies of wheat, potatoes, sugar, corn and wine for his family, and feed for his hogs and chickens, but his cash income has fluctuated considerably and he has been unable to buy all the necessities of clothing and household goods which he believes are necessary to his comfort. The high administrative costs, the donation to various charities, the gifts (which he finds it unwise to oppose) to less favored regions where food supplies are short, have always cut down the profits of the collective to a point where little is left beyond subsistence.

"The President tells us that a better day is coming," Josip says, "and that we must help out our less fortunate comrades. This may be true. I do not know about such things." He has been hoping that he may be able to save enough in a year or two to buy a cow. A few of his neighbors own cows. Petar Ristich, only recently bought a fine cow with American dollars sent him by a brother in Chicago.

To Market, To Market

Josip has a choice of markets if he has a surplus of commodities to sell. He may sell to the government, to the free market, or if he wishes to gamble on his freedom, he may take a flyer in the black market.

If he sells to the government he will get a low price, but with the sale he will receive coupons which permits him to buy goods in state stores at very cheap prices. He finds that while the prices he receives on the free market are higher, his purchases on the same market are correspondingly higher, and he gains nothing. The black market is profitable, but dangerous.

The Flexible Dinar

If his income in cash and in kind is 200 dinars per day, he receives approximately 160 of this in kind. This leaves him 40 dinars per day for the 300 working days in the year, a total of 12,000 dinars, or more if he has exceeded the norm. To compute the equivalent of the dinar in American money is not only a problem in higher mathematics, but it has its political angles as well. The Yugoslav government has set the official exchange rate at 50 dinars to the dollar. Yet black market

THINNING BEETS on the plains of Vojvodina. The women of this work brigade left their children in a day nursery. The foreman works with them, but keeps a sharp eye on the loafers. These women, from Njegus collective, are bitter-enders for their national costume—this was a hot day, but all wore woolen jackets and heavy head cloths.

quotations go as high as 300 dinars to the dollar. In buying power the dinar has in reality two values—a low value on the free market and black market and a high value when spent in state shops accompanied by a coupon. Josip might be able to buy a pair of shoes in the state shop for 400 dinars; in the free market the same shoes might cost him 3,000 dinars. With a coupon sugar costs 36 dinars a kilo (2.2 pounds); on the free market it is 220 dinars; and on the black market 360 dinars. Luxury items on the black market are beyond all hope of the peasant farmer.

The members of collectives pay an income tax of 3 per cent on their cash income. The collectives do not pay a tax. They are able to borrow money from the government at a low rate of interest to finance machinery, fertilizer, seed and stock. The private farmer pays an income tax, mostly in kind, on a sliding scale.

If Josip misses the freedom and independence of his hill farm in Montenegro, he consoles himself by counting the advantages which he now enjoys, as a member of a collective. By comparison, he now has a good house, and his family has not been hungry.

In theory at least, he is guaranteed a living, health, medical and dental services, cheap vacations, cheap prices in state stores, and security for his old age and for

A NEW AND GLITTERING BELGRADE is rising out of the rubble left by the German bombers. Center, topped by a Red Star, is the All-Slav building of white stucco on brick and stone. There are too few automobiles for traffic lights in this city of 300,000.

THIS SLAV MATRIARCH accepts the confusing changes in her country with an Oriental fatalism. War and hunger have been the lot of her race since Genghis Khan's hordes came that way 700 years ago.

his dependents. He looks forward to full mechanization of the farm and with it less of the back-breaking labor that has always been his lot.

One of the greatest advantages held out to the members of the collectives is a reduced-price vacation for those who have worked well. These vacations afford a week or two on the Dalmatian seashore at a very nominal price. Josip has not yet had a vacation. He was eligible for one this year but preferred to remain at home to work in his garden.

In Lovcenac, the cultural center, a building of brick which will eventually be covered with white stucco, is about three-fourths completed. The 5,000 people in the village look forward to its completion. Artizans and laborers among them work Sundays and in the evenings doing a few hours work each day to finish it. It will include a motion picture theatre, a dance hall, shops, barber shop, hair dresser shop, library, reading rooms and other recreation rooms, and a health center. Njegus collective is one of the few with a staff physician and a nurse.

Since the collective is taxed for the support of the aged and dependent, Josip need not save for his old age. He may spend his savings on home improvements such as new floors, carpets, vacations, clothing and an automobile, which he looks forward to in the distant future. Among individual farmers and even in the larger collectives, radios and electrical appliances of all kinds are virtually unknown. Inside plumbing in farm homes is virtually unknown and the household appliances and tools are, for the most part, very primitive. The average peasant home in most of Yugoslavia is similar to an American pioneer home of 150 years ago.

The Boss Man

The head man at the Njegus collective is the president, Bozidar Popivoda. Popivoda, a Montenegran, joined the partisans in 1942. Later he was captured by the Chetniks who turned him over to the Italians. He was given five years in prison and was sent to Italy. When Italy was falling he was sent to Germany and in 1945 he was liberated by the Russians. Before the war he worked on farms and in factories.

Popivoda is a thorough Party member and he believes the communistic world is the best of all possible worlds. He is a young man, as are most of those at the helm in Yugoslavia. He is too busy to think about carrying his ideas into foreign countries but believes what is good for the farmers of his country is good also for others. "You ought to try it in America," he says. He has adopted the open-shirt-no-tie costume which is one way of identifying Party members, and has the Party slogans at the tip of his tongue. He strikes one as able, sincere, and a good man for the job at Njegus.

Popivoda is an executive rather than a farm expert and draws on the experience and advice of an agronomist, a veterinarian, and the better farmers in the collective. Under him are 11 administrative officers who keep the books and manage the business of selling and buying, clerks and brigade leaders. In addition there is the village committee of the Party, which is very active as a political unit. The various Party and administrative officers are items of expense for the collective, demanding several times the outlay an

SIMMENTAL CATTLE are big beasts. In meat and milk production they are similar to Milking Shorthorns. Few Slav farmers have ever seen a Jersey or a Guernsey, or a pure beef breed. The countryside was combed for these cattle, levied for the Njegus collective.

American farm of the same size would need for administration. Bureaucracy, in Yugoslavia as in America, is a farm pest no spray can kill.

The Daily Bread

Members of the collectives are eating well, perhaps better than they ever did before. Since War II began the Yugoslav peasant has been short on fats and sugars and his effort is constantly bent toward increasing the fat content of his diet. If it is available, bacon or sausage is served at every meal. Indian corn is the leading crop by acreage in Yugoslavia and a great deal of it is being used for human food, especially in the poorer areas.

In the southern mountains a form of corn meal porridge is eaten three times a day the year round. Cheese and bread are on the table at every meal. The bread, of a good quality, is either whole wheat or a mixture of whole wheat and corn meal.

Beans, potatoes, cabbage are staple foods. Women can sauerkraut and vegetables, but most fruit is dried or preserved. Sugar is a scarce item, rationed and high priced. Children rarely get candy, and honey is almost a universal substitute for sugar. Some jam and marmalades are made with honey. Soap is scarce and rationed. One rarely sees soap these days in Yugoslavia, even in the best hotels in Belgrade.

Josip Stanovich, who now eats out of good pottery and has extra cups setting on the ledge in the kitchen, remembers that in Montenegro when the family had guests each was given a wooden spoon and ate out of a common wooden bowl. "In those days," he says, "there was rejoicing when we decided to kill one of the older sheep and eat it. We made stew out of potatoes, corn meal and mutton and had a feast."

Now he has meat at least once a week at home, and oftener if he eats in the collective dining room. He eats more vegetables and his meals are better balanced. His children have milk.

The Yugoslav peasant, like his counterpart in all European countries, drinks a great deal of wine. In the first place he likes wine, and in the second place, it is safer than water. He makes his own wine and sometimes distills liquor from a variety of fruits and vegetables. Many of the collectives have centralized this industry and experts are making the liquor and wine for the entire collective. Most of the hard liquor is made from potatoes, grapes or prunes. Regardless from what it is made, it is universally known as rakija, a colorless beverage extremely potent and inclined to make a very agreeable person out of anyone who drinks it.

Farm Stock

Yugoslavia lost about 60 per cent of its livestock during the war. What the German army didn't eat during the occupation, they took away when they retreated. Intensive efforts have been made since to build up the livestock population. UNRRA brought in thousands of head of stock, mostly from the United States and England. In stocking up the collectives the individual farmer has suffered. Levies have been made upon his better livestock, which have been concentrated in the collectives. During the last year collectives received 500,000 hogs by way of levies on private stock.

The farm stock is low grade by Western standards, but most of the collectives have received levies of the better animals in the country and recent importations of purebreds have all gone to the state farms or the collectives. The favorite breed of cattle is the Swiss Simmental, which serves as a

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Ray Conn, an Ohio dairy farmer, says that had the weather been right he would have cut his 20 acres of sweet clover a few days earlier. He planted sweet clover on trial, was satisfied with the results.

Sweet Clover

BY EVART VANDER MEULEN

A hundred years ago a Kentucky farmer planted a weed from his neighbor's garden, and his income started to climb. His bees had a field day, and his tobacco yield increased. The weed was sweet clover.

AMONG the legends in the hills of Kentucky is the story of the lazy farmer who first used sweet clover to enrich the soil. His name has been forgotten, but his accidental discovery that sweet clover brings higher yields on poor land has spread across the country with its promise of plenty.

Back before the Civil War this unknown hero was in the habit of planting a few acres of tobacco each year. He was not a man who liked the feel of a hoe in his fists, so he spent most of the summer days fishing; his tobacco he left to shift for itself.

He liked bees too, for the bees worked while he fished, and he occasionally went into the woods and robbed a bee tree, bringing the honey and the swarm back to his cabin. He noticed that his bees had a particular fondness for a "weed" growing in a neighbor's garden. Everybody called it "posey weed." When he gathered some of the seeds of posey weed and planted his own garden neighbors passed it up as a queer whim, but when he sowed his whole farm they accused him of being an aide to the devil, for any man who would deliberately plant weeds could be nothing less.

One spring a few years later when he needed cash he reluctantly plowed up one of his posey weed fields and planted tobacco. As usual, he neglected it in his pursuit of catfish, but it produced the biggest crop of tobacco in the county. His neighbors marvelled at what had come to pass.

They called it luck at first, but when he repeated his success the next year they agreed with him that posey weed, which we now call sweet clover, was the answer to the mystery of his big crops. Eventually, news of the value of sweet clover as a soil builder was carried out of the neighborhood by the shifting tenant population, and its use spread throughout the tobacco growing country and later to the corn and wheat areas of the Central and Midwest states. Today it occupies top place as a soil builder.

The time or method of sweet clover introduction to this country is not definitely known. It was found in colonial days in Virginia and has for centuries been common throughout Europe. Its original home is believed to be Bokhara, in Asiatic Russia.

As our pioneer forefathers moved Westward, sweet clover moved with them. It was soon found growing wild along the roadways and railways, perhaps much of it scattered accidentally by the pioneers who took with them seeds for the crop of the "New West." Some railroads, particularly the Baltimore and Ohio, planted it extensively to control embankment erosion along the right-of-ways.

The rapid spread of sweet clover as a soil improver prompted Professor W. A. Lloyd, Ohio Agricultural Experiment Station, to make a systematic survey in 1911 of the distribution, soil adaptation, habits and agricultural value of this "weed" crop. Professor Lloyd contacted the agricultural experiment stations of 34 states. Most of the states, from California to Maine, Alabama to Michigan, reported sweet clover growing extensively along roadsides, river banks, and waste places. They added that most farmers were still treating it as a weed. However a few were using the crop as a green manure and forage, and had proved its value to their satisfaction. Most of the experiment stations had done no experimental work with sweet clover up to that time, but were awakening to its possibilities.

In Iowa and a few other states the interest of farmers in the use of sweet clover prompted the state colleges to make a thorough investigation of its proper cultural practices and management.

Sweet clover, like all legumes, has the magic property of

WHEN UNDERGRAZED, sweet clover grows tall and rank. Cows have to get used to it, but if it is kept short they like it.

SWEET CLOVER has deep roots that penetrate the plow sole and aerate the sub-soil. It tops the list of soil renovating legumes.

drawing on the exhaustless sources of air nitrogen for the revitalization of the soil. Therein lies its secret of soil enrichment.

J. Ed McCue farms 6,000 acres of fine farm land in Gallatin and Saline Counties, Illinois. He has farmed this land for nearly 50 years, and he can't remember when he wasn't trying to build it up. McCue and his 20 tenants stayed in business during the depression years of the 1930's. McCue credits his unusual rotation with helping to keep his land in continued production. For the past 20 years he has grown one acre of sweet clover for every two acres of corn. This means that 2,000 acres of his land are growing sweet clover every year. McCue is sold on the soil building legume because his yields have steadily climbed and his soil tilth has constantly improved.

The Plant

The growth habit of sweet clover varies. There are two types, annuals and biennials. The annuals have yellow and white blossoms and make all their growth in one season, mature their seed, and die. The biennials, white and yellow, make from 10 to 24 inches of growth the season of seeding, depending on moisture and soil conditions. From mid-summer to early fall buds are formed on the crown of the roots. These buds remain dormant over winter and produce a strong growth of stems from the crown early the next season. The second season's growth attains a height of five to eight feet, produces seed, and dies.

The name of sweet clover is really a misnomer, as it belongs to a tribe distinct from the trifolium or clover. It does belong, however, to the same leguminous family of plants, and is closely related to both clover and alfalfa. In early growth it resembles the alfalfa plant. It is difficult to distinguish one from the other. The leaves of sweet clover are usually more oval than alfalfa, with the entire margin irregular or toothed. Also, as a rule, the foliage is less dense. It is easily recognized when in bloom by its small white or yellow flowers, and its sweet perfume, from which it gets its name.

Sweet clover thrives under many different conditions of climate and soil. Its climatic range is wider than that of any of the other clovers or of alfalfa. It is more drought resistant and yet it grows well in the more humid regions. It can well be called the Queen of the Pastures from the Great Plains to the Atlantic Coast, and from Texas to Canada.

When inoculated and well fertilized, sweet clover can grow on almost any "non-acid" soil. Although it frequently grows on badly eroded hill lands so unproductive that general farming is unprofitable, it is at its best on soil suited to the growing of corn, wheat, red clover and alfalfa.

Sweet soil is essential. To sow sweet clover on soil of high acidity is to throw away both seed and money. Because of its high calcium content and its rapid growth, sweet clover must have a large amount of lime in a short time. The plant may grow for a short period on sour land, but unless the soil near the surface is less acid than the soil at the surface, the plant soon sickens and dies. Under many conditions more lime is required by sweet clover than by any other crop. On soils that have enough lime for a mediocre stand of alfalfa, sweet clover may fail completely.

How To Sow And Prepare Soil

Sweet clover is easy to grow when the farmer follows a few simple rules. It is generally easier to grow sweet clover than most other common legumes. In the corn belt region, about 75 per cent of the sweet clover is sown at the time of seeding oats and barley in the spring. When planted with winter grain, it should be sown in early spring, February or early March in the latitude of southern Illinois, and in late March and early April in the northern part. Early seeding lets the clover germinate and grow as soon as the winter grain starts its spring growth.

It may be sown either with or without a companion crop. It may be seeded alone any time between early spring and late summer as one would seed alfalfa. It is well to do this two to three months before killing frosts to insure enough growth to prevent winter killing. When seeded alone, weeds often offer severe competition unless they are clipped with the mower set high.

Sweet clover is usually seeded on winter grain by hand broadcasting. Sometimes a grass seed drill is used, but broadcasting appears to be as good as drilling when there is enough freezing and thawing to cover the seed. When the spring grain is drilled, the clover is usually seeded at the same time with the grass seed attachment.

SWEET CLOVER SEED is hard to harvest. To reduce shattering cut when two-thirds of seeds are brown, and field is damp with dew.

Generally 10 to 15 pounds per acre of hulled (hull-free) seed is sufficient. If unhulled seed is sown, the amount should be increased one-third by weight.

Like alfalfa, sweet clover should be seeded shallow. A depth of about one-half inch on a moist, well-firmed seedbed is best for quick germination, emergence of the seedling, and rapid early growth on the heavier soil types. A depth of one to one and a half inches may be necessary on the lighter soil types to get the seed in contact with moisture.

Sweet clover, being a legume, has high nitrogen requirements. The nitrogen is drawn entirely from the soil, unless the proper nodule forming bacteria which fix atmospheric nitrogen are present. Lack of these bacteria results in greatly reduced forage yields. Sweet clover may successfully follow alfalfa without inoculation, as the same symbiotic bacteria are common to both crops, but it is always good insurance to inoculate the seed.

A Soil Conditioner

Sweet clover is the champ of the soil building crops. The heavy, deeply penetrating and widely branching tap roots open up the sub-soil. They carry with them their own organic matter which decays in a month or two after the plant dies. As the roots decay they release minerals and plant food. The decomposition products of sweet clover tap roots are gums which aggregate the fine soil particles and improve the drainage and aeration capacities of the soil.

An Indiana farm manager says, "We now grow one acre of legumes for every 30 of cultivated crops. If we could change this ratio to make it one acre of legumes to five of cultivated crops it's my belief we could double the production. Sweet clover is the best common legume for building soil."

There are two ways of breaking up a plow sole or hardpan. It can be done either with sub-soiling machines, or by nature, or both. There is a school of thought which maintains with logic that the best way to break up the compacted layers is to grow a deep rooted legume, such as sweet clover, and let nature take its course.

Sweet clover is best known as a green

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SWEET CLOVER cut for hay should be harvested just before the bloom period. It is hard to dry, makes only fair forage.

THE ONLY BROODY HEN in a flock of 250 hybrids, this one hatched a clutch of duck eggs.

THE HYBRID CHICKEN

BY GRANT CANNON

"THESE hybrid chickens are the best laying hens I've ever owned and that's a fact," says Milford Byler, whose farm is on the rolling hills of the Mad River Valley at West Liberty, Ohio. "They've been laying well for over half a year and haven't dropped below 70 per cent egg production yet," Byler continues. "I've had New Hampshires and other breeds that would hit above 80 per cent, but they could only keep it up for about a month and then they would start tapering off. These birds went to a high of 86 per cent and kept production above 80 per cent for five months. Even with summer prices I'm clearing about $50 a week at a time when I used to be just about breaking even."

Byler's flock of 700, with which he is so well pleased, are Hy-Line chickens, a trade name for one of the in-bred crosses that are now on the market. His chickens, scratching around in the deep litter of his hen houses, look like slightly outsized Leghorns. They weigh a little over five pounds and have the unkempt ragged appearance of any flock that has been in high production for a long time. Their legs and beaks are bleached white; they have molted their neck feathers and their wing and body feathers look tattered and dusty.

Byler bought these birds as day old chicks from a Hy-Line distributor at just twice the price standard bred chicks would have cost him. He raised his flock without any special care and brought them into production at five months, about the same time his standard bred chickens used to drop their first eggs. The Hy-Lines, however, surged into full production and achieved good egg size a month after starting to lay, much faster than the standard breds used to. Though the eggs his hybrids produce are slightly tinted, he has been able to get white egg prices for them in a market where brown eggs are docked. The egg buyer says that he is able to pay white prices because the hybrid makes up for its color defect by uniform egg size and shape, shell texture, and fewer blood spots. Not all buyers, however, take such a liberal point of view. Byler was also able to sell his cockerels at top prices, though some buyers dock the hybrids to Leghorn rates. The cockerels were sold at 12 to 14 weeks, averaging three pounds.

Byler claims that his death losses among the chicks and later among the laying hens have been slightly less than with standard bred flocks, and the number of culls he has taken from his flock makes an even better comparison.

In the past Byler has depended on an all pullet flock to make a profit. With the hybrids he is not so sure (the hybrid breeders, themselves, are still debating this point), but says, "I know darned well I'm going to hold them as long as they are making money. If they lay as long as Wallace Kaufman's birds did last year they ought to keep going for 14 months. That's what he told me and he's a minister in the church, so I've got to believe him."

The word hybrid comes from a Greek word meaning outrage or wantonness and for centuries was used as an expression of extreme contempt. The creation of hybrid

corn and the discovery by American farmers that its use would put money in their pockets has changed the meaning of the word and it is now almost synonymous with productivity.

The spark plug that causes hybrid corn and Byler's new chickens to perform so remarkably is called hybrid vigor. This greater capacity for growth and performance is often present in the offspring of cross-bred animals and plants. In chickens and corn it is produced by mating closely inbred lines with other inbreds giving the offspring a far greater vitality and productivity than either of the inbred lines that produced them. Not only do the hybrids outshine their parents, which had lost a lot of their pep through inbreeding, but they usually perform better than the standard bred stock that produced the inbred lines. The geneticists have not explained just why this happens, but, like true scientists, they have a flossy word to describe hybrid vigor. It is heterosis.

For centuries we have been breeding mares and jacks to get strong tough mules, but it took the plant breeders to show the way to the present exploitation of hybrid vigor. In 1905 G. H. Shull, a geneticist with the Carnegie Institution, began his experiments in corn breeding at the same time that E. M. East was starting his first plots of inbred corn at Illinois Agricultural College. These scientists began their work for the purpose of studying the theoretical principles of genetics, but their reports gave the world its first inkling of what could be done with hybrid corn. The practical application of their findings led to the establishment of a breeding industry that has materially increased the annual corn yield of the nation.

Corn is a natural for the production of hybrid lines. Since the plant has both male and female parts, it can be bred to itself. This means that a high degree of inbreeding can be achieved very rapidly. The best the poultryman can do is to mate sister and brother. Another important factor is the number of seeds that can be produced by planting a single kernel. This makes it possible to build up a large supply of inbred plants for crossing with other inbreds.

Even though corn has a many-fold increase, the growers found that with each generation of inbreeding their production fell lower. When they finally reached the point of making the cross to produce the hybrid the yield was so low that seed production was not profitable. Their solution to this dilemma was simple and ingenious. A single cross hybrid is made by crossing two inbred lines; a second single cross hybrid is made with two other inbred lines; both of these single cross hybrids have the vigor that is required to produce abundant seed; a double cross hybrid is then created by crossing these single crosses. This is the seed that is put on the market. The double cross hybrid keeps all the hybrid vigor of the first crosses and can be produced in large enough quantities to make seed growing profitable. The hybrid vigor is a one shot proposition, however, for crossing a hybrid with itself produces a mongrel with low vitality and poor yield.

The genetic principles that have been found to work with corn production are now being applied to poultry. It is not surprising that the two largest hybrid corn

FREAKS SHOW UP when inbreeding uncovers recessive characteristics in the strain. The oddly matched pair above are full sisters, one of which shows a recessive characteristic which inhibits growth. The angry looking monstrosity with the cock-eyed beak demonstrates another hidden factor, cross-beak. If these characteristics were dominant the line would soon die out; as recessives they persist in the genes until inbreeding uncovers them.

HENRY B. WALLACE makes a selection for a breeding pen. In addition to visual inspection, he has the pedigrees and production records of the ancestors of these birds to guide him. He will also consult their individual records, showing rate of growth, early feathering and maturity weights, which are kept for each bird. The progeny performance will be added to the record of the cock selected.

producers, DeKalb Agricultural Association and Pioneer Hi-Bred Corn Company, have now turned to the chicken business. Pioneer, through its Hy-Line Poultry Farms, began its experimental work in 1935 and reached commercial production in 1942. DeKalb began their project later and they will have a commercial chick on the market in 1950.

The Inbred Chicken

The crossing of the inbred lines produces the hybrid vigor, but the old adage about making a silk purse out of a sow's ear still holds good; you must develop good inbred lines to start with. One of the major purposes of inbreeding is to get uniformity by purifying the hereditary factors that will determine the make-up of the hybrid produced.

This purification by inbreeding is largely a matter of bringing recessive characteristics to the surface and exposing them. They may have been in the family for generations without ever being suspected because dominant characteristics covered them up. A recessive characteristic is one that will not show up in the offspring unless both parents are carriers of this trait. When brother-sister matings are made in poultry both birds will have very similar hereditary factors and the recessive traits will begin to show up. Let us say that the hereditary factor, or gene, for crooked toes is recessive. A hen which carries this gene and one for straight toes in her make-up will have straight toes herself and, as long as she is crossed with a male having only the straight toe gene, all of her offspring will have straight toes though some will carry the crooked toe characteristic as a recessive. If, however, the hen is crossed with her brother who also carries a crooked toe gene, a quarter of the offspring should show up with crooked toes and the geneticists will know that this hidden characteristic is carried in the line. As brother and sister matings are carried out for several generations the parents come closer to having identical hereditary backgrounds and the recessive characteristics show up more easily.

Careful culling of the flock by trapnesting and pedigree breeding eliminates the undesirable characteristics and concentrates the good qualities. This matter of culling is carried on with a ruthlessness that would shock the average poultryman. In one generation of inbreds 90 to 97 per cent are commonly discarded by the breeders. DeKalb, for instance, started out with a flock of 10,000 of the best birds they could secure and, through a process of rigorous culling, ended with 250 in their breeding pens. Space alone is one of the factors that forces the breeders to cull so drastically. If all of the offspring of each generation were saved the breeding establishment would have to triple and quadruple their breeding pens each generation.

Once the inbreeding starts the recessive

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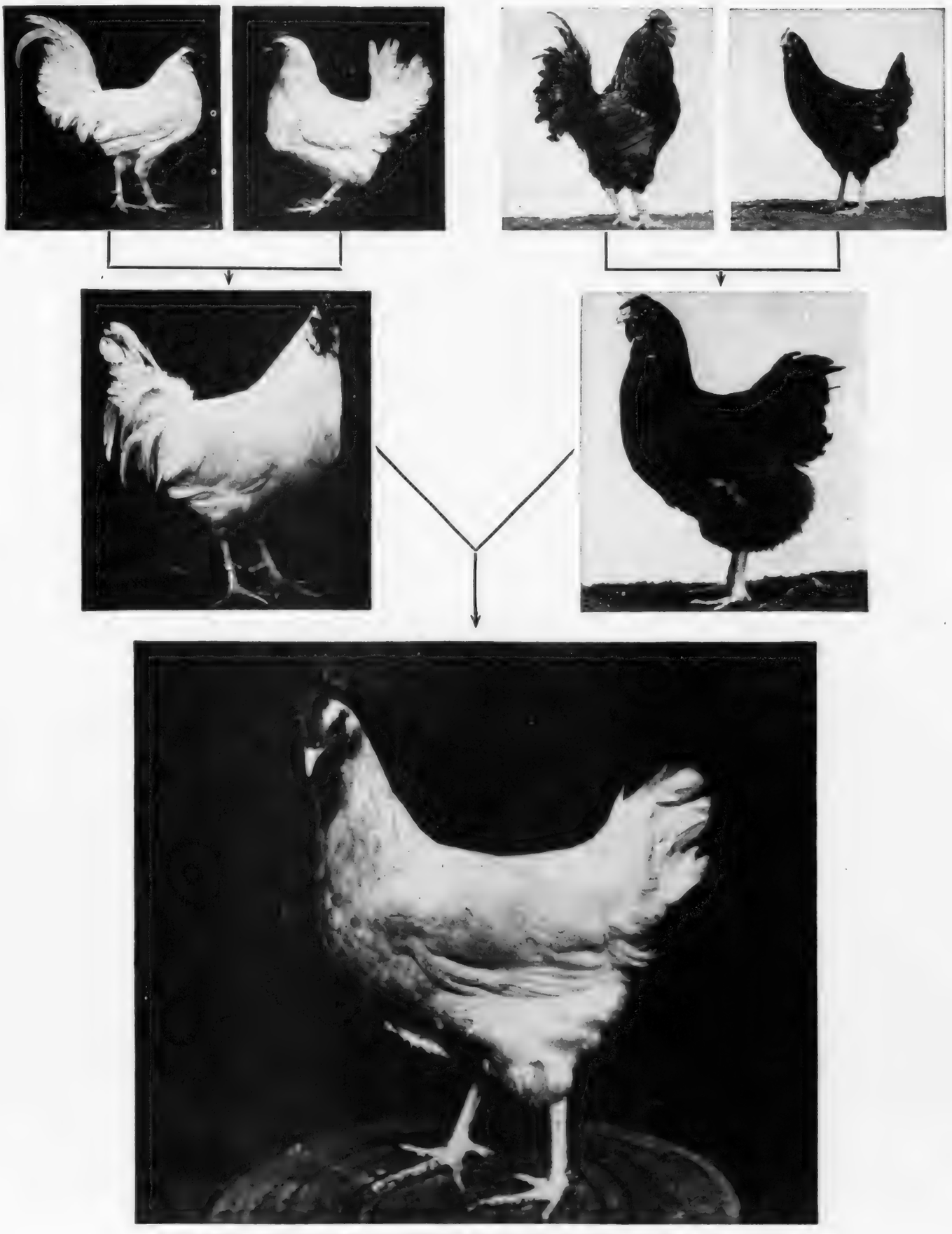

A HYBRID HEN AND HER ANCESTORS illustrate the breeding procedure. An inbred Leghorn cock (top left) crossed with a Leghorn hen of a different inbred line produces the single-cross hybrid below them. An inbred New Hampshire cock (top center) crossed with an inbred Rhode Island Red hen produces the other single-cross hybrid. These two are the parents of the commercial hybrid. The above is the Pioneer breeding plan; DeKalb and other breeders use different inbred lines to produce their hybrids.

Spanish Moss, which goes into chair cushions and mattresses, lives on air. The bayou people pull it off swamp trees and cure it in their own back yards.

Spanish Moss

BY SAM MIMS

FOLKS along Bayou Plaquemine in Louisiana give Prospaire Rivett credit for having once said to a daughter, "Be brave, my child, and silently suffer the bites of red ants and black spiders. Remember, we moss-pickers must provide soft beds for the fat, lazy bodies of city men and women." Others say that Domain Gagnoux never gave up trying to figure out a way to pick, cure and gin Spanish moss without destroying the ants and spiders which commonly infest it. Whenever Domain thought of these pests crawling from new mattresses to torment the Royal Street merchants he'd laugh until his belly shook.

Acadian moss pickers are not vindictive, and such pleasantries are told along the bayous to remind the youngsters that they are of a strong breed who can laugh at hardships.

Spanish moss is the *lagniappe* crop of the bayou people, one of the bounties provided by *le bon Dieu*. It is not planted nor cultivated; it is free for all, for all strong and courageous men to gather and use—and sell to soft city folks. And that is why the swamps are open to all. No one ever heard of a moss-picker concerning himself about boundary lines or land titles or asking permission of anyone to strip the cypress, tupelos and oaks wherever they may stand.

Some 30 years ago big sawmill companies sent men into the bayou country to fell trees; that was when moss-pickers made more money than they knew how to spend. By following timber cutters a large family of workers could gather several tons of green moss in a day. It was easy to drag the moss from felled tree-tops and load it onto barges that rested in one of the nearby bayous.

One of those sawmill companies had the effrontery to question the primordial law of the swamps. Having bought the

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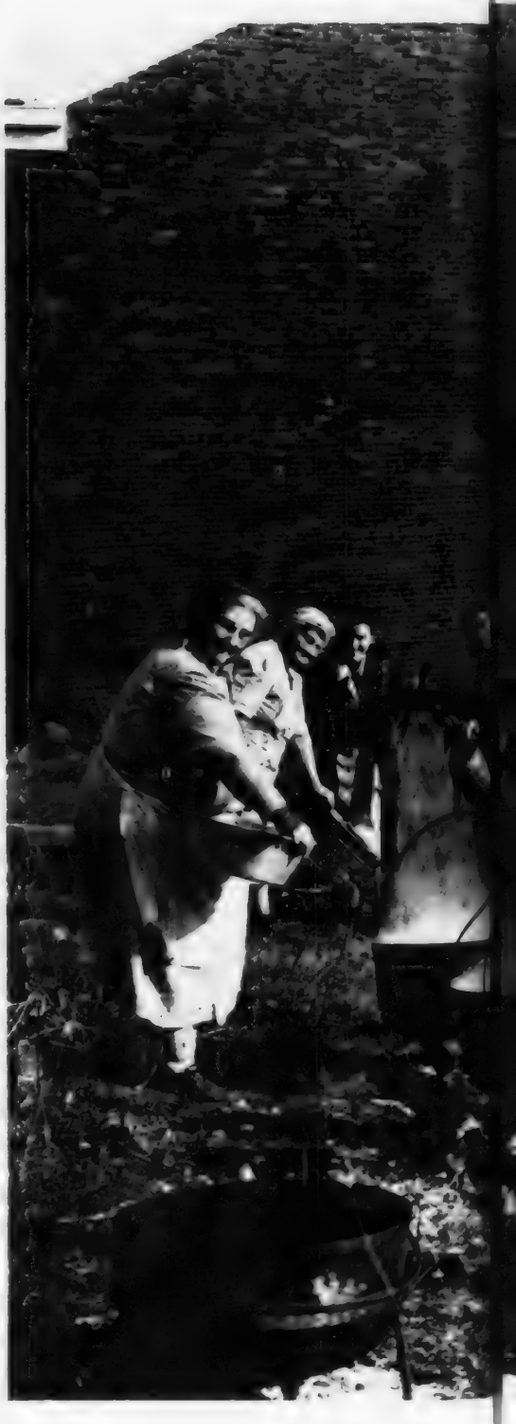
AUTUMN ON THE FARM

In the city no one whistles yesterday's tunes, but in the country we say the old songs are best. The routines of the seasons were discovered by our grandfathers: they are not as soft as our modern way, but their rewards are genuine.

Just before the first snow, when the crops are all in and there's a slack time, the farmer with an eye for future comfort buzzes a pile of wood for the fireplace. He may have an automatic oil furnace, but he still likes to feel the forthright heat from a burning log on the seat of his pants when he comes in after doing the chores on a cold winter afternoon. Power from his tractor or a portable gasoline engine beats the old way of the crosscut saw: he bows to that modern change, but the fireplace is of another and more strenuous age.



When the snow flies, there is nothing so satisfying as a barrel of apples in the cellar, rows of hams and sides of bacon hanging in the smoke house, and braided strands of popcorn and peppers hanging from the rafters in the attic over the kitchen. The grocery, with cases of frozen vegetables, fresh meat, and fruits from the tropics may be a three minute drive away to the cross-roads, but the age-old urge to stock the larder against the winter is strong within us. The human squirrel sleeps better of a winter night if his storehouse is full.

The country ham has never been displaced by the packinghouse product, which is, to a farmer, a tasteless, tough and altogether inadequate substitute. And neither has the annual butchering ever been seriously threatened as a social affair by modern gatherings. There is no shortage of help at butcherings. When several farmers pool their tools and work, they bring along all the family and all the relatives within driving distance. There is a glut of help, and many youngsters underfoot unless they are packed away to school.

A pony receiving intravenous injection of Sodium Thiosulfate for Arrowgrass poisoning.

Poison In The Pasture

BY EDWARD AND VIRGINIA MATSON

Pastures, fence rows and barnyards harbor lethal weeds that may kill or damage stock. Weed poisoning is difficult to diagnose, is often mistaken for disease.

IF YOU are a dairy or stock farmer there is a good chance that you have had a substantial loss of income at one time or another from the effects of plant poisoning in your herd. Dairy farmers are usually spared the heaps of dead animals found poisoned on the open ranges, but their losses are high from lowered milk production. Tainted or discolored milk, or a severe loss of yield in cows sickened by a poison plant can be as severe a loss as a crop failure, especially if the animals are so badly set back they have to be culled from the herd. One type of tainted milk is also extremely dangerous to humans, causing epidemics of illness in whole communities with symptoms similar to "summer flu."

Last spring, Lawrence Springer of Waukegan, Illinois, a neighbor of ours and a "one-cow" farmer, brought his beast in from the field sick, staggering, and breathing heavily. In a few hours she was throwing her head about crazily, had fallen, and was in convulsions. The veterinarian who was called shook his head in despair. He started intravenous dextrose feeding and said it was "poison." Twenty-four hours would tell the story. She would either recover or she wouldn't, and there was nothing else to do.

"Probably poisoned by some plant," he said. "I have cases like this every spring, but there are so many weeds in the pasture, I can't keep track of them all. If it were pneumonia, now, I could help you, but I don't know what kind of poisoning this is."

A few hours later the cow gave a long sigh and respiration ceased. Her pulse kept on for a few moments after she had stopped breathing, but her heart finally ticked to a stop. The farmer swore, "Three hundred dollars of good cow to the soap works! What kind of a plant could kill an animal like that?"

He brought his problem to us, a botan-

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POISONOUS PLANTS AFFECTING LIVESTOCK

PLANTS	DESCRIPTION	SYMPTOMS AND EFFECTS	TREATMENT
WOODLANDS BLACK LOCUST Robinia pseudoacacia	Tree has long lacy leaf with small paired leaflets. Flowers are white and fragrant; blossoms in May or June. Legume pea-like pod with kidney-shaped seeds. No thorns. 60 feet tall. Poisonous: Bark, twigs, flowers, anytime.	Eating any part of plant or water in which seed pods soaked produces irregular heart action, feeble breathing, dilated pupils, dull yellowish mucous membranes, colic, purging, thick ropy urine, dizziness, mania, death, very shortly after onset of symptoms unless treatment can be started at once.	Digitalis.
 BRACKEN or BRAKE FERN Pteridium Latiusculum	Perennial ferns with black root stocks; wide, broadly triangular three-part fronds; leaf edges curve back over numerous spore cases. Fronds 2′ to 4′ long on 3′ stems. Poisonous: Leaves, hay, during drought in late summer.	A cumulative poison producing a high fever. Then rapid loss of flesh. difficult breathing, excessive salivation, bleeding from the nose and in droppings, and congested, hemorrhage, or jaundiced mucous membranes. Symptoms sometimes confused with anthrax and are very different in horses.	Raw linseed oil or soybean oil laxative. Warm bran mash.
 CHOKE OR WILD CHERRY Prunus	Cherries, plums, all varieties of prunus, especially wilted leaves on wild varieties. Smooth dark bark; green oval leaves with small toothed edges, and white flowers in umbrella clusters, red fruit. A small tree. Poisonous: Wilted leaves during drought.	Eating wilted leaves containing prussic acid causes animal to stagger, fall, convulse, breathe with difficulty; mouth turns blue, coma; expires, very shortly after onset of poison.	Intravenous sodium thiosulfate with sodium nitrite Corn syrup and molasses through stomach tube.
 DUTCHMAN'S BREECHES Dicentra Cucullaria	Small perennial grows from tubers: flowers, small, creamy white. shaped like Dutch trousers hanging upside down. Leaves, very deeply indented lobes, almost fern-like. Poisonous: Leaves, bulbs in early spring.	Feeding on plant, especially tubers before the middle of May will cause staggering gait, diminished milk supply. Later, frothing of the mouth, trembling, losing cud, convulsions, labored breathing, and diarrhea. Animals generally recover.	Purgatives, stimulants, soybean oil, mineral oil, or melted lard.

PLANTS	DESCRIPTION	SYMPTOMS AND EFFECTS	TREATMENT
MOUNTAIN LAUREL Kalmia latifolia SHEEP LAUREL Kalmia angustifolia	Laurels have long, lance-shaped leathery, greenish to brown, evergreen leaves; flowers are showy pink and white bunched in clusters among leaves; five petals fused with ten dark anther pockets. 2′ to 10′ high. Poisonous: Leaves in winter or spring.	Eating 0.2% of animal's weight produces irregular breathing. Later, salivation, vomiting, frothing at the mouth, grating teeth, partial blindness and falling; in extremes, drowsiness, stupor, death. May recover if poison is not too acute. Meat is poisoned.	Linseed oil in drench. Butter or soybean oil in emergency.
WHITE SNAKEROOT Eupatorium urticaefolium	Perennial herb of composite family. Broadly oval leaves with coarse toothed edges like nettles. Opposite arrangement on stems. Flowers in dense white clumps atop stems; abundant fibrous roots. 1′ to 5′ high. Poisonous: Whole plant, during drought or late summer.	Produces milk sickness in man and marked trembling and weakness in cattle which continues into constipation, nausea, labored, rapid breathing, falling, grinding teeth; pungent acetone odor on breath. Possibly fatal.	Purgatives, stimulants, laxatives, injections of calcium gluconate. Keep on milking but destroy milk.
MARSH PLANTS ARROW-GRASS Triglochin	Perennial, grass-like; small greenish flowers along a slender stem; narrow leaf, rounded on one side, spongy on other. 6 to 12 inches tall. Poisonous: Leaves in early spring.	If 1% of animal's weight is eaten quickly, symptoms of cyanide poisoning develop—difficult breathing, muscle spasms, blueness of mucous membranes, coma, and death due to respiratory failure. Symptoms in rapid succession; treat promptly or animal will die.	Intravenous sodium thiosulfate with sodium nitrate. Corn syrup and molasses through stomach tube.
HORSETAIL OR SCOURING RUSHES Equisetum	Long, stiff stems with separatable joints. Two plants, one with brown cone-shaped spore cases atop stem. The other sterile, many branched. 1′-5′ tall. Familiar along R.R. tracks. Poisonous: Stalks, hay, anytime.	First symptoms are weakness, loss of flesh. In few weeks a lack of muscular control, excitability, falling. Towards end, rapid, weak pulse, difficult breathing, pale mucous membranes, diarrhea, convulsions, coma.	Stimulants, purgatives; 1 tsp. nux vomica three times daily until coordination is restored. In early stages place on grain ration.
SNEEZEWEED Helenium autumnale	Tall-winged stems, alternate leaves; sunflower-like flowers, with drooping, toothed rays; flowers in clusters atop tall, coarse plant. Yellow and purple varieties. 3′-6′ tall. Poisonous: Flowers in late summer and early fall.	Eating autumn flowers produces initial symptoms of rapid pulse, difficult breathing, plunging, staggering and extreme sensitivity to touch. After eating large quantities of blossoms animals may suffer sudden spasms, convulsions, death.	Melted lard may help.
WATER HEMLOCK Cicuta	Parsley-like leaves with hollow, jointed stems, and hollow pithy rootstock and roots. Flowers in umbrella clusters. Oil has pungent odor. Stems streaked with purple ridges 2′ to 6′ tall. Poisonous: Whole plant in early spring.	Eating very small quantities, particularly roots produces violent convulsions, frothing at the mouth, respiratory failure, death in a few hours.	Injections of morphine, chloral hydrate. Purgatives, emetics, stomach pump.
WASTELANDS COCKLEBUR Xanthium	Large grapevine-shaped leaves, stiff and hairy; hairy stems; olive-shaped bur with hooked spines. Kill deadly seedlings by burning out parent plant in fall! 3′ tall. Poisonous: Seedlings in early spring.	Within 24 hours after eating 0.75% of animal's weight of young green plants animal shows weakness, inflamed stomach, rapid, weak, pulse and breathing. Later, spasms of the neck muscles, vomiting, weak breathing. Death, if it occurs, during 24 hours.	Fatty substances, raw linseed oil, mineral oil, lard, cream, or even whole milk through stomach tube.
DOGBANE OR INDIAN HEMP Apocynum	Stems covered with tough fibrous bark, filled with milky juice; oblong, smooth leaves, paired on stem; greenish-white flowers and long slender pods with milkweed-like, flossy seeds. 1½′ to 5′ tall. Poisonous: Whole plant, hay or anytime.	One-half to one ounce of fresh green leaves can kill a cow. First, rise in temperature, sweating, strong pulse, cold extremities, dilated pupils; later, inside of mouth and nostrils become discolored and inflamed. Bowel action is frequent; fatal unless treatment is started early.	Empty stomach. Tannic or gallic acid, Atropine at frequent intervals; quiet, warm.

PLANTS	DESCRIPTION	SYMPTOMS AND EFFECTS	TREATMENT
NIGHTSHADE Solanum nigrum	Hairy, angular, many-branched, weak stem; wavy-toothed, medium sized, thin, green leaves; white drooping clusters of flowers; purple berries. 1′ to 2′ high. Poisonous: Whole plant, before fall.	Early symptoms are: stupefaction, nausea, constipation; later, lost muscular coordination, sense of feeling and dilated pupils. In severe cases cramps, convulsions, and respiratory paralysis.	Stimulants. Barbiturates, when in state of excitement.
MEADOWS AND FIELDS JIMSON WEED Datura Stramonium	Stout, coarse annual; spreading branches; large, purplish, green, strong-scented leaves coarsely toothed. Flowers, large trumpet tubed, white or purplish. Seeds are prickly capsules called thorny apples, splitting into four lengths. 2′ to 5′ high. Poisonous: Whole plant in hay, during growing season.	Early symptoms include rapid pulse and breathing, dilated pupils, restlessness, muscular twitching, frequent urination. In fatal cases, pulse weakens, breathing slows and is irregular, sub-temperature, no urination, convulsions, coma.	Tannin, empty stomach. Caffeine for stimulant. Artificial respiration. Barbiturates or morphine in convulsive state.
JOHNSON OR SUDAN GRASS Sorghum	Coarse, perennial grass with creeping underground rootstalks. Leaves 1′ to 3′ long, ¼ inch wide, have conspicuous white midveins, loosely branched; spreading seed head and end of stem. Poisonous: Stalks, especially if frosted or wilted, during drought or late summer.	Cyanide poisoning; rapid difficult breathing, giddy, falls, heart action weakened, almond odor on breath, muscular spasms, paralysis of respiratory and circulatory centers of brain, bloat; death, within a few hours after poisoning.	Intravenous sodium thiosulfate with sodium nitrite. Corn syrup and molasses through stomach tube.
INDIAN TOBACCO Lobelia inflata	Erect, single stemmed, lacy herb. Alternate oval leaves with leaf stem 1 to 2 inches long and toothed margins. Pale blue, bell-like, 2 lipped flowers in angles of upper leaves. 1′ to 2′ tall. Poisonous: Leaves, stems, fruits, anytime.	Eating large quantities causes dilated pupils, nausea, and vomiting. Later, exhaustion, prostration, stupor, and coma may precede a rare instance of death.	Stimulants, purges; antidotes and tannic acid to precipitate alkaloids. Artificial respiration.
LARKSPUR Delphinium	Perennial, deeply indented leaves in 3-5-7's. In spring spurred flowers are clustered along tops of stems; are usually blue. Low, 1′ to 3′ high. Poisonous: Whole plant in early spring.	Small amounts causes loss of appetite, staggering or muscular incoordination, and constipation. Eating 0.5% of weight causes slobbering, nausea, vomiting, colic, bloating, convulsions. Death may follow convulsions and paralysis of respiratory system.	Quiet; epsom salts by mouth. Hypodermic injection per 500 pounds body weight: 1 grain physostigmin salicylate; 2 grains pilocarpin hydrochloride; ½ grain strychnine sulfate. For bloat use stomach tube.
POKEWEED OR POKEBERRY Phytolacca Americana	Tall, smooth, purple, succulent herb; small white flowers in clusters on ends of stems; dark, flattened spherical, purple berries with crimson juice; 3′ to 10′ tall. Perennial from large tap root. Cooking destroys poison! Poisonous: Root and berries, anytime.	Eating small quantities causes retching and vomiting after two hours. Later, spasms, purging, and convulsions may develop. Severely poisoned animals may develop respiratory paralysis resulting in death.	Antidotes for alkaloid poisons.
MILKWEED Asclepias	Hairy stem exudes a milky juice; seeds flossy, cotton-like, and airborne. Leaves may be broad, flat, thick, opposite; or long, lance-shaped and whorled on stem. Purple flowers grow in clumps atop stems in late summer. 1′ to 3′ tall. Whorled variety most deadly! Poisonous: Tops and leaves, hay, mostly in spring.	A violent poison in green tops of young plants—only 0.1% of body weight can produce death. Loss of appetite, diarrhea, loss of cud, develop first day after poisoning. Later, falling, paralysis of rear limbs, labored breathing, spasms: respiratory failure may cause death.	Quiet and sedatives.
POISON HEMLOCK Conium maculatum	Biennial; purple spotted, parsley-like leaves, parsnip-like roots. Showy, umbrella-clustered flowers: disagreeable odor. 3′ to 6′ tall. Poisonous: Whole plant, in spring.	Loss of appetite, slobbering, nervous tremors, rapid, feeble pulse, muscular incoordination, and great pain. No convulsions as in water hemlock.	Remove stomach contents; purgative, tannic acid; artificial respiration.

A FEED LOT, neglected during the summer and allowed to go to weeds, may grow enough poison to damage a whole herd. By intent or accident, cows often get into the poison patches. An odd afternoon job to mow it, but keep the point of the scythe down.

ist-chemist, husband-and-wife team, in the hope we could discover the cause of his cow's poisoning.

We determined that we would not accept the verdict, "Unknown Poison." With Muenscher's *Poisonous Plants of the United States* and the 1942 *Yearbook of Agriculture* in hand, we set out with the farmer across the pastures in search of the offending plant. We had a clue—Daisy's breathing had stopped first, and so it must be a poison that causes respiratory paralysis. Because of this and because of her very violent and sudden end, we were able to boil down the cause to three plants, milkweed, larkspur, and water hemlock. In her last pasturage we discovered that she had been tethered in a large infestation of milkweed. There were the tops neatly cropped in a moment of ravenous hunger or of a foolishly depraved appetite. Back in the barn lay the body, and now we had found the culprit!

During the summer we were visiting a friend, a dairy farmer, and mentioned our neighbor's loss. He pricked up his ears at once. "Why, I've lost three animals myself in the last ten years. The vet just said, 'forage poisoning.' Something she ate in the hay, he thought." We named several weeds that poison hay——horsetail, jimson weed, dogbane. He invited us to look over his place with him. Sure enough, clustered around his barnyard and buildings we found quantities of jimson weed, a definite menace to his present herd. While 99 per cent of the time a cow is too well-fed to eat a poisonous plant, let a drought come or let her get hungry in the barn and then turn her loose where there are dangerous weeds and she'll commit suicide right in her own pasture.

Conditions Of Poisoning

There are three ways for most living things to be poisoned: by contact, which usually produces a skin irritation or dermatitis, as from poison ivy; by the injection of venom directly into the blood, usually by reptiles and only rarely by plants; and last, but most important in cattle poisoning, by eating.

There are more than 75 plants which injure an animal through its digestive tract, and they produce characteristic symptoms in the part of the body which they attack. For example, cyanogenetic plants attack the blood by interfering with the oxygen-carrying capacity of the red blood cells, thus turning the blood blue. Wild cherry and wilted Sudan grass contain the poison, hydrocyanic acid. Delphinin in larkspur is an alkaloidal poison which will depress the nervous system. There are muscular poisons, such as the alcohol tremetol, in white snakeroot, which cause a violent muscular trembling and weakness.

Poisons that affect the brain do so in three ways: by causing a drowsiness or narcosis as does the opium in poppies; by causing mania or delirium as do the poisons in jimson weed and black locust; and by causing intoxication or inebriation as do the poisons in toadstools, wormwood and jamaica dogwood.

A number of poisons are violently irritating. Among these are plants containing saponins, such as bouncing bet, and the poisons in castor bean and may apple, which also cause a violent diarrhea. Ergot, an irritant, produces abortions.

A number of plants eaten by cattle do not seriously affect the animal's health but may cause the farmer severe loss by spoiling the flavor or appearance of the milk or by depressing the supply. Flavor is affected by yarrow, wild garlic, onion and carrots; and buttercups turn the milk red in color and diminish the supply by their irritating action.

Pure mechanical poisons are: seeds burrs, hairs, awns, hooks and spurs, which are to be found on plants like sandbur, squirrel tail grass and mullein. These irritating plant parts tear the flesh around the eyes and mouth, producing open sores that lead to blindness and starvation or open channels for infecting bacteria. They get into the hooves, crippling the animal and causing it to fall behind the herd. Mechanical irritants that are swallowed set up ulcerous conditions in the walls of the digestive tract or may form large hair balls which obstruct digestive channels.

Certain plants poison only through their seeds. In the past many farmers have inadvertently fed dangerous quantities of cockle seeds to their poultry and livestock which they had carefully screened from their wheat. Prior to that, when cockle seeds were ground into flour, many human

beings were poisoned and a few died from the effects of the saponin, a violent emetic poison. Castor bean cakes and cottonseed cakes should never be fed fresh to animals, as the ricin and gossypol in the residual oils are dangerous poisons which take time to be oxidized by the air and made harmless. Grain infested with ergot should never be fed to cattle, as ergot is a dangerous poison which may cause abortion, gangrene and other serious effects. Fungus growths such as toadstools are poisonous to cattle as well as man.

Some plants have strange and unusual effects on animals. Some plants contain photodynamic substances which, when exposed to the actinic rays of the sun, will produce a violent reaction in the animal in whose blood stream they travel. Cattle growers are often thrown off the track by symptoms of dermatitis breaking out on the white patches of skin or hair of their beasts and they believe that some spray or outside contact has caused the injury. Dark-skinned patches contain enough pigmentation to screen out the undesirable light rays, whereas the white-skinned or white-haired patches are very susceptible. Dyeing the skin of affected animals or keeping them out of the direct sunlight will often offset the damage. In addition to dermatitis, falling hair and trifoliosis or bighead are symptoms. Alsike clover, St. John's wort, buckwheat, bunch grass, and rabbit bush are examples of plants that produce photosensitization under certain conditions.

Another dangerous poison, dicumarol was recently isolated from spoiled sweet clover. This discovery has explained the peculiar spongy masses of blood under skins of animals and their sudden death from hemorrhage after such minor operations as castration or dehorning. While this substance has become a valuable medicinal for human beings when administered under carefully controlled conditions, since it interferes with the mechanism of blood clotting, it is a dangerous forage menace to cattle.

By far the most interesting plant poison from an historical standpoint is that which causes "milk sickness" in people and "trembles" in cattle. The month of August or any drought period was one of terror and sadness to isolated pioneer settlements along the Ohio river, because of the great loss of human life and valuable cattle that took place from some mysterious source of poison. Mists from the river, poisonous dew, volatile minerals were but a few of the fantastic theories of the cause of "puking fever" given by the settlers. Animals became listless, lost weight, trembled violently after any exercise, and frequently died a violent death. Human beings, drinking the milk of the poisoned animals, perhaps even before the animal showed outward symptoms of poisoning, were severely constipated, vomited a greenish fluid, became delirious and appeared to be suffering from a high fever, although they actually had a depressed temperature. Both animal and human victims had malodorous breaths like acetone or sewer gas. Nancy Hanks Lincoln, the young mother of Abraham Lincoln, and the Lincolns' neighbors, the Sparrows, died from this poisoning in an outbreak in 1818 at the little Indiana community of Pigeon Cove.

Thirty years ago the offending plant was found to be white snakeroot, *Eupatorium urticaefolium*. Subsequently, jimmyweed or rayless goldenrod, and *Aplopappus heterophyllus*, a plant with no common

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FARM ANIMALS die in lonely pastures; their stiff and flyblown remains are found—and often death is regarded as an Act of God. Better practice is to seek out the poison weed and destroy it. Danger is greatest when the herd is first turned out in the spring.

March of The SPITTLE BUG

THE farmer who named the spittle bug was observant, like the unknown character who named hogs "hogs". If your alfalfa field looks like a gang of thirsty sailors has passed recently, all spitting to windward, then your field is afflicted with the spittle bug. In spite of his name he's not something you can laugh off. He is a destroyer, has a growing pup's appetite, and has an effective armor against insecticides.

During the past summer the spittle bug moved in dangerous numbers into hay fields, pastures, and strawberry patches in the Midwest, and is already well entrenched there. If his career isn't halted soon he will become a permanent member of the army of insects competing with the farmer for his crops.

Farmers have learned that the bug moves first into their legume crops which are stunted. Spittle bugs in the strawberry patch mean yellowed leaves, small berries, and low yield.

In the adult stage the spittle bug is a winged leafhopper-like insect with an insatiable appetite. In the immature stage, it is a tiny yellow wingless nymph that spends all its time eating and growing. As he sucks fluids from growing plants he creates bubbles of foam that soon encase him in the spittle from which he gets his name.

A field heavily infested with the nymph stage of the spittle bug has gobs of foam, which looks much like the beaten white of an egg, which may show up any place on the plant. A walk through a spittle infested field will dampen the farmer's trouser legs with spittle and his spirits with visions of lowered income.

The spittle bug is not a newcomer to the Midwestern farm scene, but only in recent years has it become concentrated enough to become a major threat to crops. Insect specialists have long believed that the spittle bug's habitat was confined to swampy uplands, in localities with a cool moist climate. In parts of Maine, which supplies such conditions, the spittle bug problem is an old one.

During the past three summers the spittle bug developed into a serious menace in Ohio, Wisconsin, and Michigan. So far, farmers west of Wisconsin have not been bothered with the pest.

Life Of The Spittle Bug

The spittle bug has three stages in his life cycle. He spends the winter months as an egg snugly encased close to the ground in the stems of grasses, legumes, and weeds. About the middle of April the tiny eggs start to split open and the newborn nymphs climb up the stem of their host plant for breakfast.

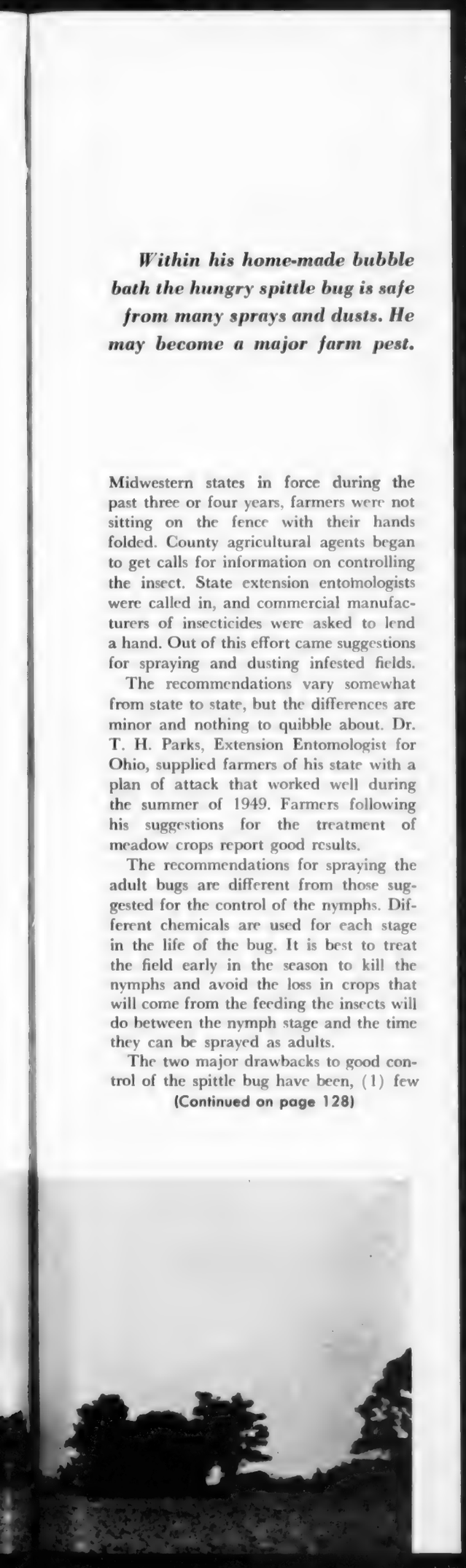
The nymphs, about the size of a timothy seed, may congregate in groups of a dozen, and as they feed they work up the spittle masses which reveal their presence. As they get bigger they separate and each one usually takes up residence in a mass of spittle all his own.

The bugs live and feed in their homemade bubble bath until about the middle of June when they start to change to adults. They eventually crawl out of the spittle mass looking like chunky overgrown leafhoppers. The adults are yellowish or grayish in color and are often mistaken for leafhoppers. Once they have become adults they no longer secrete spittle. While they are not as obvious as they were in the nymph stage, the adults are just as busy. They go right on eating. They will continue to feed until the first frost kills them. By that time they have laid eggs for next year's crop.

The adults with the help of the wind, are highly mobile. They scatter over the surrounding fields eating as they go. They may migrate to wheat heads, or move into young corn. They can do little damage to wheat, and so far farmers haven't complained about them cutting corn yields. During July, however, they can make a damaging cut in the yield of legume crops.

While the spittle bug was moving into

NORM McGEE dusts a southern Ohio meadow with 30 pounds to the acre of three per cent DDT dust for adult spittle bugs.



Within his home-made bubble bath the hungry spittle bug is safe from many sprays and dusts. He may become a major farm pest.

Midwestern states in force during the past three or four years, farmers were not sitting on the fence with their hands folded. County agricultural agents began to get calls for information on controlling the insect. State extension entomologists were called in, and commercial manufacturers of insecticides were asked to lend a hand. Out of this effort came suggestions for spraying and dusting infested fields.

The recommendations vary somewhat from state to state, but the differences are minor and nothing to quibble about. Dr. T. H. Parks, Extension Entomologist for Ohio, supplied farmers of his state with a plan of attack that worked well during the summer of 1949. Farmers following his suggestions for the treatment of meadow crops report good results.

The recommendations for spraying the adult bugs are different from those suggested for the control of the nymphs. Different chemicals are used for each stage in the life of the bug. It is best to treat the field early in the season to kill the nymphs and avoid the loss in crops that will come from the feeding the insects will do between the nymph stage and the time they can be sprayed as adults.

The two major drawbacks to good control of the spittle bug have been, (1) few

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CHINCHILLAS

BY GLENDON R. HERDMAN

Chinchillas were taken from their native Andean Mountains, and soon became the most valuable fur bearing animal in captivity. They are easy to raise, and anybody can get them for about $1,600.00 a pair.

AT PRESENT, the precious and costly chinchilla is not in the least worried about losing his expensive hide. Contrary to the old adage, "There's safety in numbers," this lucky little rodent can thank his Andean ancestors that, as yet, his kind is more valuable as a breeder than a pelt. And, according to experts in the field. his reprieve is apt to continue for another five or six years.

The chinchilla is the most valuable fur animal known. One hundred and fifty pelts will make up a full-length ladies' coat which can in turn be sold for $35.000. There are only 25 chinchilla coats in the world today.

In 1918 an Indian trotted into the Andean camp of M. F. Chapman, U. S. Anaconda Copper mining engineer. The Indian was carrying a five-gallon can. Approaching Chapman, the Indian pointed to the can, grinned, and said, "Chinchilla!" The animal was half dead from lack of food and water, for the Indians believed that chinchillas never drank. Chapman bought the chinchilla and soon became interested in them.

He applied for trapping permission from the Peruvian, Bolivian, and Chilean governments. The officials, at first, answered with a firm "no". Only after much persuasion did they finally relent and grant Chapman the permit he sought.

So scarce were the chinchillas that it took 23 Indian trappers nearly three and one-half years to capture 11 of the ani-

mals which Chapman considered suitable for breeding stock.

Profiting by the failures of others before him, Chapman and his royal cargo descended but a thousand feet a month, thus allowing the chinchillas to adjust themselves to the lower altitudes. The animals were kept in a huge wooden cage, with a built-in compartment for ice. It took a year for the party to reach sea level, but the animals lived and were healthy.

At the seaport, Chapman ran into additional obstacles. The South American authorities were dead set against his exporting the chinchillas. Only after wading through an endless maze of red tape did he finally win his point.

He booked passage on the only transport available, the S.S. Anyo Maru. Sensing that the Japanese captain would insist on carrying the chinchillas in the hold, where they would surely die while crossing the equator, he decided upon a clever ruse. The cage was put aboard, disguised as cargo, and 11 of Chapman's friends, each with a chinchilla in his pocket, came to Chapman's cabin to bid him bon voyage.

Shortly after clearing port, the Japanese captain discovered the presence of the smuggled chinchillas. As Chapman had expected, the captain insisted that the animals be carried in the hold. "If these animals are not left just where they are," Chapman said, "I'll sue your company for one million dollars." The captain thought it over a moment, hissed apologies, and left.

As the ship approached the equator, the whole venture nearly ended in disaster. The little animals all but smothered in their own fur. Chapman demanded all the ice aboard ship—and got it. By packing the cage with ice, and keeping the stateroom's electric fans constantly running, he kept his chinchillas alive. Then, as the Anyo Maru steamed out of the tropics and the weather cooled, the chinchillas lost their fur. Arriving at San Pedro, California, in February, Chapman was faced with the problem of keeping the animals from freezing. He substituted blankets and hot-water bottles for ice and saved them.

The first year in America went so badly that it was a toss-up whether Chapman's dream would succeed or become a nightmare. As the seasons in North America were just the opposite to those of South America, the chinchillas at first grew their heaviest fur during our summer months. Fortunately, by 1924, they became acclimated to the schedule of seasons and resumed a normal interest in life. Late that year, the first chinchilla litter in America was born.

On March 24, 1925, the first pair of chinchillas ever sold in America brought Chapman a check for $1000.

During 1926 Chapman established his original farm on two acres of land at Inglewood, California. That site now contains 26 multiple housing units, service buildings, offices, and a well-equipped laboratory, owned by Chapman's son.

At the present time there are about 900 chinchilla ranches and approximately 55,000 animals in the United States and Canada. Until these herds total between 300,000 and 500,000 the main profit to the industry will continue to be in raising chinchillas for breeding purposes. What will happen to chinchilla breeders' incomes when there are enough of the animals to supply demands for fur remains to be seen.

Meet The Chinchilla

A full grown chinchilla is about half the size of a cottontail rabbit. The lustrous blue-gray, black-tipped fur is an inch or more deep, and so soft, that with your eyes closed, it's impossible to tell when you are touching it. Whereas humans have but one hair to the follicle, chinchillas may have 80 or more.

The head of this little rodent, with its cat-like whiskers and wrinkly nose, resembles that of a rabbit. The bushy, turned-up tail is similar to a squirrel's.

The chinchilla is one of the cleanest, hardiest, and healthiest animals in the world. It is free from vermin, and has no offensive odor.

Besides being gentle and fond of affection, it has a well developed curiosity. Although it may hop rapidly into the sanctuary of its nest box or dart behind the exercise wheel at your approach, curiosity soon conquers caution and before long it will sneak a quick look, then come hopping out to investigate.

CHINCHILLA HOTELS on the Chapman Chinchilla Farms at Inglewood, California, are arranged both for the convenience of workers and comfort of the animals. Chinchillas need sunshine, but must have quarters that protect them from temperature extremes.

Chinchillas, as livestock prices go, come rather high. High quality breeding stock costs $1600 a pair. At least one breeder sells them for $400 down, with the balance in 36 monthly payments. Two pair is considered the best number with which to start.

A purchaser may find it preferable to board his animals temporarily, while building up his herd, rather than to build housing, and care for them himself. This will run around $3 per animal per month.

In 1943, the "BAR-3" Ranch of Inglewood, California, started in the business with two pair. Later that year an additional 13 chinchillas were purchased. From the original 17 animals the ranch now has 125. Jim Cashman and his mother, owners of the "BAR-3", say, they have sold some but prefer to hold on to what they have to increase their herd.

What Do You Risk?

Well established chinchilla ranchers usually give some sort of a warranty with a purchase. Some will give a free course in the care of the animals.

The mortality rate varies from 15 to 25 per cent. There is on the market at the present time, a vaccine—developed over the past five years, by Dr. Hilan F. Keagy, D.V.M., of Chapman's Inglewood Farm —which is used to prevent diseases rather than to cure them. It has been used on some 5000 chinchillas during the past three years, and has considerably reduced the mortality rate. Although the normal life span of the chinchilla is usually between seven and eight years, exceptions are common, some having been known to live to over twice that age.

Selecting Breeding Stock

Only good breeding stock from reliable breeders should be bought.

Consult the rancher's records. Reliable ranchers all keep accurate stock records, and should be willing to let you examine them. With each animal purchased you are entitled to a certificate of pedigree. Each animal should be registered with the National Chinchilla Breeders Association of America, P. O. Box 1806, Salt Lake City 12, Utah. This Association will send the certificates to the rancher from whom you purchased. He, in turn, will forward them to you.

Chinchillas are vegetarians. Although extremely fastidious in their eating habits, they are not difficult to feed. It costs only $2 to $3 to feed a chinchilla for a year. If the feed bill runs higher, the breeder is probably over-feeding.

Along with scientifically prepared pellets, the feeding regimen is made up chiefly of alfalfa, dried grass, oat, bean, and timothy hays; fresh greens, and barks. Chinchillas are especially fond of apple bough or Flowering Maple, but pear twigs and quite a few other branches and twigs that have a clean bark will do just as well. Barks and twigs that have been exposed to dogs should never be used. A cyst-forming organism carried by dogs can be passed on to your animals.

A satisfactory diet can be made up of pellets, roughages, and barks. One commercial pellet is San Fernando Chinchilla Pellets which may be purchased through The Distributor Feed Co., 4435 Lennox Blvd., Inglewood, Calif. At present, these pellets sell for $7.25 per 100 pounds, plus freight charges. There are also a number of other satisfactory pellets on the market.

The average chinchilla will eat one and a half teaspoons of pellets daily, plus hay. The animals are also fond of occasional tidbits such as almonds, raisins, walnuts, and sunflower seeds.

Automatic feeders, feed boards or dishes have all proved satisfactory. Any type of feeding equipment that is easily kept clean and permits ready access to the feed will do.

Chinchillas are night feeders. The ideal time for feeding is around sundown, when they begin to show signs of activity. The animals soon learn when it's "chow" time and are anxiously awaiting it. Feeding should be held to a regular schedule.

Watering

Chinchillas drink less than a tablespoon of water a day. There are two types of watering systems in general use. One is the dew-drop system which is a nippled pipe running through the pens. It will release water when the animals press their teeth against the nipple.

Another very satisfactory system is a small water bottle containing a rubber cork, from which a glass or pyrex tube about four inches long protrudes about one inch into the pen.

Chinchillas can be bred when they are six months old. When mating chinchillas be sure that both of their pedigree records are tops. Pair the animals that have good, long, dense, silky fur, and match their coloring as closely as possible. Choose only the largest and most vivacious of your animals. This will pay off with healthier

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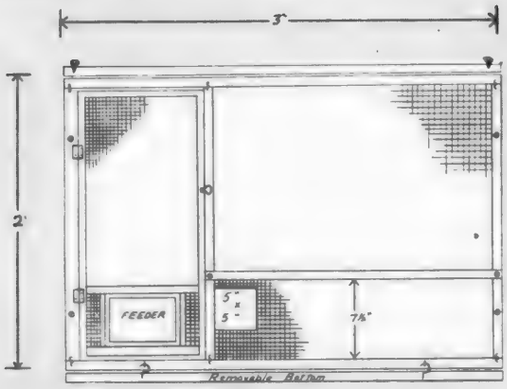
THE CHINCHILLA PEN



Pens for chinchillas can be simple, but for large operations they should be standardized for convenience in feeding and cleaning. The cage pictured at the top is the type in use on the Chapman Chinchilla Farms at Inglewood, California. Attached to the front are hay rack, nest box, water bottle, and record card. The drawing shows the dimensions of the ready-made chinchilla pen made and sold for $30 by L. J. Chudley, 2360 Midvale Ave., Los Angeles.

FREE MERRY-GO-ROUND rides (right) help chinchillas keep healthy. These exercise wheels can be made from scrap metal. Place one in every pen.

SMOTHERED FROM OVERCROWDING, these hogs represent a half-ton loss of pork and lard.

HANDLE WITH CARE

You can't label your stock "FRAGILE" when you ship them to market, but you can take simple precautions that will cut losses.

"THERE'S an old saying that pretty well fits the stock buyer," George Dordaller, who *is* a buyer, says. "It goes, 'Fool me once, shame on you. Fool me twice, shame on me.' When you work as a buyer for 20 years at the same stock yards, as I have, you get to know the farmers who ship in stock and the truckers who haul it to market. I've been stung pretty badly on occasion, but you can bet I was darn careful the next time I made a bid on that farmer's stock. On the other hand there are farmers and truckers who always deliver good stock and I'm always willing to bid a little high on their stuff because I know that the animals have been fed right and that they won't be damaged in handling."

Farmers expend a great deal of feed, money and effort producing meat in the form of cattle, hogs, and sheep, but between the time they finish their production job and the time it is delivered to the packers there is a huge loss. A part of this loss is damage from handling and hauling; a part is from shrinkage.

Shrinkage can't be eliminated but may be reduced by careful handling. It varies with the class of animals and with the seasons. An example of shrinkage is shown in a study made by the Virginia Polytechnic Institute. Over two thousand head of cattle, on their way to the stock yards some 650 miles away, were weighed at the farm where they averaged 1,526 pounds and weighed again on arrival where it was found that the average shrinkage amounted to 131 pounds per head. True, the animals regained some 56 pounds of the loss within five hours of arrival, but that still leaves a lot of weight the farmer was not paid for.

A different kind of loss, and one that can be greatly reduced, comes from bruised, crippled and killed animals. This loss amounts to around $33,380,000 worth of meat each year. Bruised animals cause the biggest part of this loss but dead and crippled animals make a substantial, unpleasant contribution to the waste.

Railroads, meat packers, and the consuming public all absorb a part of this loss,

but it is the farmer who really takes the beating. The animals he ships to market remain his property until the deal is closed with a buyer. If they die or are injured in transit by truck or in the yards he may recover their value if the trucker carries insurance. Railroads carry no insurance but pay damages themselves. If they are bruised and in bad condition when they arrive at the market he takes an immediate loss from lower bids on his stock. Overloading of either truck or car may jeopardize collection of damages.

This is not the only way he loses, however. The lost meat that shows up in the packing house tankage because of bad handling is reflected in the lower bids buyers make on all livestock. An increase in the number of dead and cripples that arrive at the yards will be reflected in a higher insurance rate all farmers will pay when they buy insurance.

All of the bruised meat, along with the broken bones and the torn meat around them, is condemned by the veterinary inspectors. This meat and the animals that arrive at the market dead is put in the inedible tank and converted into commercial, inedible grease and tankage.

The farmer knows too well that the biggest part of this loss is going to be shifted to his shoulders. It may seem unfair to him, but the facts seem to show that he is directly responsible for a big part of the loss and that he could prevent a good part of the remainder of it by safe loading and by dealing with reliable shippers.

A Tally On Bruises

For the past three years Wilson and Company, one of the Big Four meat packers, have run weekly tests on hogs and cattle at various stock yards to determine the loss in dollars and cents caused by bruising alone. They also wanted to find out the age, location and causes of bruises, and other important items such as the effect of the type of transportation on bruising, the age and size of the animals bruised, and the effect of the weather on this loss.

The tests showed that 36 per cent of the hogs and 39 per cent of the cattle that were examined had been bruised. The loss in trim and devalued cuts of the damaged animals amounted to over 42 cents a head on hogs and $5.22 on cattle. Not only were the bruises more costly, they were also more numerous on the higher priced cuts of meat. You just can't kick a hog as he goes up the loading chute without endangering the hams. The packers say, "If you must kick the hog, remove your shoe first."

An effort was made in these tests to compare the amount of damage in shipping by truck and by rail. It was found that 31.86 per cent of the cattle shipped by truck were bruised as compared with 50.89 of the cattle shipped by rail. Hogs trucked to the market showed 35.51 per cent of their number bruised while 37.85 of those shipped by rail were damaged. In evaluating this information, Ralph May, one of Wilson and Company's men in charge of this study, said, "You must keep in mind the fact that the animals shipped by rail traveled a greater distance than those shipped by truck and also that most of those shipped by rail had been driven to the railroad loading points by truck. Since there are practically no straight rail shipments today, it is almost impossible to say how much of the bruising occurred in the railroad car and how much on the truck delivering the animals to the railroad."

A study of the bruises that had been inflicted on cattle led May and his associate,

SOLID FOOTING makes it easy to march these cows into the truck. Materials for this cement block chute cost $25 before the war; the farmer supplied the labor himself. Today materials would cost $20 more, but would still be well worth the price.

Harold A. Henneman, to conclude that almost two-thirds of them were caused by crowding, bumping and rushing. Around 18 per cent were caused by trampling; nine per cent were man-made with whip, cane or club; and five per cent were caused by horns. The bruised hog carcasses told a different story. Here 40 per cent of the bruises were caused by irate handlers using canes or clubs; another 19.6 per cent were caused by kicking or prodding; 16.6 per cent resulted from crowding and trampling; 11.4 per cent were inflicted by pitchforks, nails or other puncturing implements; and one and a half per cent were spreaders caused by slippery flooring and icy runways.

Up to this point the farmer might shake his head and say, "So that's the way those truckers and stock handlers treat my good animals after they leave here. And I have to foot the bill!" But the study takes up the age of the bruises, which is not hard to determine. It was found that 46.7 per cent of the bruises on swine occurred on the farm before loading and that 70.6 per cent of the cattle bruises were over two days old. Since the cattle were slaughtered from one to seven days after leaving the farm or ranch it is difficult to say exactly how much of the damage was caused before they were shipped.

Though bruised stock causes the largest part of the loss in livestock shipping, crippled and dead animals account for an annual loss of some $7,350,000. Fortunately, there are a number of things the farmer can do to minimize the losses.

A SNACK FOR CALVES and feed for other animals is provided when they debark for their legal rest after 28 hours of travel on the railroad.

BRUISED HOGS make this battered sedan a costly form of transportation.

The Loading Chute

"One of the surest ways to cut down loss in shipping livestock," Al Huser, manager of the Zumstein Stock Farm near Cincinnati, Ohio, says, "is to have a good substantial loading chute with cleated or rough cement flooring to prevent slipping. The chute should be located where the truck can get to it without too much backing and filling and should be connected to a holding pen. That way you can gather the animals an hour or so before the truck is due and they can quiet down before you march them up the chute.

"We buy and sell milk cows and do a lot of shipping. We bring them down from Minnesota and Wisconsin, unload them here, and later load them again to send to buyers. With care we are able to deliver them without a bruise, and most of them won't even fall off on production. I built my concrete block loading chute before the war at a cost of about $25.00 for material. That didn't include labor, which I did myself. At today's prices the materials would cost $20.00 more."

Huser's belief that a farm chute will save injuring animals is enthusiastically supported by the authoritative voice of the National Live Stock Loss Prevention Board and by a whole chorus of truck drivers who run into this problem every day. C. H. McNie, Executive Officer of the National Live Stock Loss Prevention Board, says, "If we can get a good loading chute on every farm that ships stock, a big per cent of the damage will be eliminated. The chute should be part of the farm yard or feed lot where the animals would become accustomed to it." The Board, whose main offices are located at 700 Exchange Building, Union Stock Yards, Chicago 9, Illinois, have prepared plans for a practical farm chute. The Board also has available plans for a chute and holding pens designed by Ray Cuff, their Kansas City regional manager, that includes a layout for holding pens and a spraying alley. Cuff says, "Do the job right. Have a place where you can spray your livestock for grubs, lice and mites twice a year connected with a chute that will put them onto a truck without damage. You'll pay for the job in the savings of a year if you handle any sizable number of animals."

The truckers, who haul every day from the best and the worst farms in their districts, are even louder in their demand for good chutes. "The thing we usually run into," says Elmer Temple, an independent trucker from Centerville, Indiana, "is about three chutes to every 30 farms. We usually collect the animals early in the morning, sometimes before it is light, to get them in for the early high buying. Too darned often when we get to the farm we find that the animals we are going to haul

WHAT PROFITS A FARMER, who spends the cold winter in the feed lot doling out his grain, if careless handlers damage his stock on the way to the market?

are still out in the field and the farmer has no chute for loading. We carry a portable loading chute with us and keep it in good condition, but to my mind this is a makeshift affair. We go out to the field, hustle the animals in and then have a rodeo trying to get them to go up the chute; they want to walk around it and go back to the pasture. The animals are all keyed up from having been driven in and they don't want to walk up a strange chute. Everybody's patience is soon worn mighty thin and it's easy for a man to start beating on them. And the chasing around doesn't put any weight on the stock either. Farmers don't seem to realize that a calf will lose from 12 to 20 pounds on a short trip and the more you chase them the hotter they get and the more weight they will lose.

"Another thing about chutes," Temple continues, "is their location. Some of them are in awkward places for a truck and some of them are completely useless in winter and spring when the barnyard gets churned up. I remember one place where the chute seemed to be in an ideal spot for loading. We filled two decks of the trailer with hogs in short order and were starting away when the front wheel of the trailer seemed to collapse. I got out and found that the right front wheel had caved through an old well that had been covered for 28 years. Even the farmer had forgotten that it was ever there. The hogs were piled up in the front of the trailer and we had to move them up to the rear to get them off so we could get the trailer out of the hole and load up again. There

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THESE RED FOX pups are cute, harmless, and playful. By late autumn they will be hunters like their parents.

The Little Foxes

BY GEORGE FICHTER

FEW farmers have any fondness for the fox. They consider the fox an enemy to be reckoned with and figure the best place for him is on a woman's coat. To the average farmer the fox is crafty, sneaky, worthless and chicken fed. The farmer keeps a 12-gauge handy behind the kitchen door and when he gets a little spare time he goes out to exterminate foxes.

One farmer who hunts foxes for his neighbors as well as himself is Bill Geisler of Butler County, Ohio. Geisler is an expert at killing foxes. There is little time for fox hunting from early spring until late autumn, but he finds time to hunt during the winter months when farm work is slack.

Geisler is not an orthodox fox hunter. He uses no dogs, and still-hunts every fox he kills. "My father hunted with hounds," he said, "but my feet got tired following the dogs. I figured it could be done a whole lot easier." He either outwits or out-endures the fox. During the winter of 1948-49 he killed 29 foxes. "That was a mild winter," he says, "and it lowered my average." Two years ago he took 31, and the winter of 1946-47 he hit a peak of 42, all killed within a five-mile radius of his farm.

Geisler's method of hunting foxes is an unusual one that should give the crafty fox the advantage. Sometimes he hunts alone and sometimes with his brother, but always it is man against fox.

Geisler hunts for the sport of it. He thinks it is foolish to travel several hundred miles to hunt big game when he has a greater challenge right in his own back forty.

Since the fox is a wily, evasive animal, Geisler's ability to kill so many has won him local fame. "Foxes all act about the same," he explains. "After you study a fox for a while you know about what he's going to do before he makes up his mind himself."

Geisler figured out the habits and tricks of foxes by following their tracks through the snow. If night came on before he had bagged his fox he often returned early the next morning to pick up the trail and complete the previous day's unfinished business. It's easier for him to bag a fox when there's snow on the ground, but he no longer considers snow an essential. He has learned to follow fox trails through muddy fields, wet leaves, or pasture grass almost as easily as a hound dog.

He never takes a chance shot. It he shoots at a fox, the fox goes with him. He has lost only two cripples out of nearly 400 kills during the past 20 years. "Forty yards," he says, "is the ideal shooting distance. If they get as far away as 80 yards, I hold off for another try. Sooner or later a fox waits too long before he flushes."

But despite his mechanical approach and uncanny accuracy, Geisler knows that he can make no error, and still expect to take a pelt. While he is busy trying to collect the fox's coat, the fox is busy trying to keep it.

When hunting, the fox moves slowly. His stride is graceful and he is alert for every movement. The males and females stay together for most of the year although they may change mates every year or so. After they have mated the pair choose a homesite from the old fox or woodchuck dens in the neighborhood. Well beaten trails lead through the underbrush to the entrance of the den. The female has from four to nine pups in March or April after a gestation period of 51 days. The gray fox gestation period is 63 days. After about five weeks the young pups start coming out to the entrance of the den and begin frolicking in the sunlight. The male fox hunts for his family until late summer when the young are taught to hunt for themselves, so that by winter they can be on their own.

Few farmers object to Geisler's hunting on their land. They often call him to report a fox they've seen. Calls come in pretty regularly during the spring months.

He sells the skins but the present low price of pelts will just about pay for his ammunition. In 1948 they brought only about 50 cents each, with very few buyers even at that price. But Geisler can remember when fox pelts brought $20.00. He says over the past 20 years they have averaged $7.00 or $8.00.

Two kinds of foxes, the red and the gray, live in our Midwestern and Eastern states. "Grays are pretty scarce here," Geisler says. "I get about one for every ten reds."

There are two reasons for this. First, the gray fox is more plentiful farther South and has extended its range Northward in fairly recent times so that it is still not as common as the red. Second, the gray fox prefers the deep woods and marshy areas, and is quick to hole-up when chased. It leaves the open farm lands to its red cousin.

Red foxes, on the other hand, are daring. You might find their den within 50 yards of the barn. They seem to find a certain zest in being hunted. On a chase a red fox will often pass his den several times. He may wait until the hound's breath is ruffling the fur on his tail before he dashes for cover.

The gray fox, even though he is predominantly gray, is sometimes mistaken for a red because of the red hair on the inside of his legs, along his belly, and behind his ears. The red fox is easily identified. With the exception of the black behind his ears and his black stockings, his coat is almost entirely reddish orange.

The young of both are born in late March or early April. After four weeks they begin playing around the entrance to the den, but for several months they depend on the adults to bring in the groceries. It is during this period that an adult fox is most likely to visit the farmer's chicken house. When there are eight or ten mouths to feed, a mouse doesn't go very far. A chicken provides a fair meal for an average litter.

What Foxes Eat

According to wildlife experts, both grays and reds vary their diets with the season. The fox experts use two methods of determining what foxes have feasted on. One is examination of the middens around a den. Sometimes portions of uneaten car-

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DURING 20 YEARS of fox hunting Bill Geisler says he has missed only two foxes. He uses no dogs, figures out the fox's itinerary and waits for him to come in range.

Covered BRIDGES

Scattered across the country are nearly 2000 covered bridges in daily use. Once the most modern of bridges, these timber structures are yielding to concrete and steel. A group of hobbyists is working to save them.

ITS SIDING LOST in the battle with the elements, this covered bridge across the Suncook River, in New Hampshire, is still well preserved. A few covered bridges are more than a century old. They often outlast steel and concrete.

ON THE sultry afternoon of June 14, 1877, the old covered bridge at Northampton, Massachusetts, lurched from its foundations, sailed crazily through the air, and crashed 1,000 feet away into the bed of the river.

Like the Bridge of San Luis Rey, it carried with it a burden of human and animal freight. Eleven persons with six teams of horses had taken shelter under its roof when a black and ominous cloud had risen out of the north, and when the tornado had struck they became airborne with the bridge. One woman died in the twisted and splintered wreckage; six men were cut and bruised. It was the wonder of the countryside that only one person died in the total destruction of the bridge.

Most of the covered bridges of the country are doomed to destruction, not by act of nature as the Northampton bridge, but by the hand of man to make way for progress.

The covered bridge is a link in yesterday's highways, and yesterday's highways and bridges were designed for the horse and buggy.

Scattered across the country there are still some 2,000 covered bridges, most of them doing daily duty, their plank floors rattling beneath the wheels of trucks and automobiles. Ohio alone has more than one-fourth of those still in use. The state claims 563½ covered bridges, splitting ownership of a bridge on the state line with Indiana.

In New England and the Pacific Northwest trains still thunder through a few covered railroad bridges. In California there are a handful of covered foot bridges.

The origin of the covered bridge is lost in antiquity. It is not unique to America. There is one recorded as having been built in Babylon in 783 B.C. No one is quite certain when the first one was built in this country. Some antiquarians say the bridge that Timothy Palmer built over the Schuylkill River at Philadelphia in 1804 was the first in this country. Early settlers were skeptical about their durability, and wherever one went up in a community it was freely predicted that it would vanish on the crest of the first spring freshet. By 1810, however, the covered bridge was accepted as the most modern structure with which to span a stream.

In the early days the bridges were built either by the villages which they were expected to serve, or by private individuals. In either case toll was collected to pay for the structure. Some towns conducted lotteries to raise money for bridge building. Several bridges were financed in this manner until local church leaders pronounced the method "sinful gambling," and public pressure brought a stop to the practice, although church goers usually crossed free of charge on Sunday morning.

When the erection of a bridge came up for debate, the town hall was crowded with local citizenry and out-of-town bridge engineers.

In the Midwest most of the bridges were erected by the counties, on county roads.

The bridge builders were carpenters with a flare for engineering. When bidding for a bridge building job they carried with them a model of their bridge. The models were elaborately painted and decorated. One bridge engineer who aimed at making his bridges working structures rather than works of art was Lemuel Chenowerth. He showed up one night at a bridge planning meeting in Richmond, Virginia. He watched the other engineers give their sales talk on their fancy bridges and display their models. When it came Chenowerth's turn he brought out a sturdy, unpainted model of his favorite bridge. He gave no sales talk, but silently placed two chairs in the middle of the floor and rested one end of his model on each chair. He then straddled his model with his feet dangling. He got the contract.

The minor specifications for a new bridge were usually left to the builder. The town selectsmen decreed only that it reach from shore to shore, and be wide and high enough to accommodate a load of hay.

There were always those among the towns people who considered thrift a greater virtue than progress. It was about 100 years ago at a town meeting in Vermont that a farmer stood and asked for permission to speak. "We've built four bridges in this town, four bridges within two miles," he said, "now we're asked to build a fifth. Mr. Moderator, I move we bridge the whole damn creek—lengthwise."

Once the site was chosen, the bridge planned, and the price agreed on, the engineer moved in with his construction crews. With the aid of ox teams, and the free advice of a crew of pioneer sidewalk engineers, he cut timbers and hewed them into beams. The beams and timbers were fastened together with wooden pegs instead of nails.

THE SIGN, in French, on this Canadian bridge warns "Cross with more than 6000 pounds at your own risk!" Canada still has many covered bridges on country lanes.

THE FAMOUS Burr arched truss keeps this bridge sturdy after three generations.

COVERED BRIDGES were usually occupied by boys at mid-day and ghosts at night.

One of the most famous of the early bridge builders was Theodore Burr. One of his bridges built at Waterford, New York, in 1804 carried traffic until 1909, when it met its untimely end because a poorly insulated electric wire set it afire.

Burr was a shrewd showman. When he started a bridge the usual kibitzers gathered on the banks to watch the construction. He soon had them at work heaving timbers and driving pegs. Burr reported after one job that his admiring gallery waded into icy water up to their arm pits to help his crew. He added subtly that there was considerable drinking, but little intoxication.

In Burr's day engineers possessed no precision instruments to help them with their calculations. They built their bridges by guess and by gosh. Some guesses were good, some bad. The bad guesses, however, didn't remain long on the rural landscape to embarrass their builders. Unless a bridge was well built it fell apart in the first flood or windstorm that came along. The cautious engineer built his bridges with a wide margin of safety. The margin was so wide in many cases that decades later some of the bridges are carrying trucks weighing several times the original load limit. When a new bridge was finished the engineer checked it for sturdiness. The test was simple. The builder drove a herd of cattle across to test its vibration and strength. Burr originated the arched truss which appeared in many bridges later, and which bears his name.

Not all early covered bridges were built by the towns. Often they were built by business men who charged tolls for crossing. The location of a bridge determined its value as a commercial venture. Old records indicate that some of the most profitable ones were situated where there was a settlement on one bank of the river and a saloon on the other. Saturday night became the busiest of the week. The wise bridge tender soon learned which of his customers would be able to pay on the return trip and which should pay for the round trip on the way over.

The usual procedure for a person caught at the bridge with no money in his pocket, and with darkness in his favor, was to attempt to run the bridge or climb up and cross on the roof.

The toll rates for covered bridges were fairly standard, and were posted at the entrance near the toll house. The following is a typical list:

1. Each foot passenger ..... 1 cent
2. Each horse and rider..... 4 cents
3. Carriage with horse .....10 cents
4. Sleigh and one horse..... 5 cents
5. Passenger vehicle with more than one horse .....20 cents
6. Farm wagon with two beasts .....10 cents
7. A neat creature (cow) ..... 1 cent
8. Each sheep or swine ..... ½ cent

Only one person is considered the driver of a team to pass free of toll.

In addition to his tolls the bridge owner was entitled to a part of the fine if he caught a traveler breaking the traffic laws on his bridge. A few old covered bridges still bear weather-worn signs which announce, "$2.00 fine for riding a horse over this bridge faster than a walk, or for driving more than 20 head of cattle over it at one time. One half the fine to the informer."

In many communities the covered bridge became a social center. It absorbed so much character from those who traveled it that it took on a character of its own. On rainy afternoons it became a meeting place for travelers and farmers who waited out rain storms under its solid roof. On bright summer days it shaded the pool beneath it and gave the local boys a cool place to swim.

Country swains carved their initials on its timbers, coupling them with their sweetheart's in a bleeding heart frame. The rafters were a fine place for small boys to play. Their older brothers and sisters often called the structure "The Wishing Bridge" and as they gained courage changed the name to "The Kissin' Bridge." The toll was a kiss for every plank, and the slower the horse the more pleasant the crossing. The covered bridge also made a dry hard surface on which the local militia could drill. Every salesman that passed seemed to find room to add another poster to its walls. The virtues of horse liniment and kidney pills were displayed on its walls. The bridge also became a refuge for mud-daubbers and mourning doves that nested in the rafters and eaves.

There were many cases where the pride of community ownership prompted the citizens to name their new bridges. In southern Indiana is a bridge that earned its name. The broad side boards of the bridge disappeared with annoying regularity. Someone discovered that they were making their way into the neighborhood homes where they were used as tables for pasting wall paper in the spring time. The covered bridge became known as the Papering Board Bridge.

Bridges were often named for local celebrities. One bridge in Monroe County, Indiana, was called the Nancy Jane Bridge, for Nancy Jane Chambers. Another bridge built at the same time was known as the Judah Bridge, until a few night travelers had their religion scared out of them by herds of hogs sleeping inside the structure. After that the bridge became known as "Judy's Damn Bridge."

Covered bridges, like English castles, were favorite hangouts for ghosts. Haunted bridges were usually debunked by the simple expedient of capturing the animal which had taken up residence. In one case in Missouri the spirits turned out to be an escaped pet raccoon wearing a collar and a short length of clanking chain.

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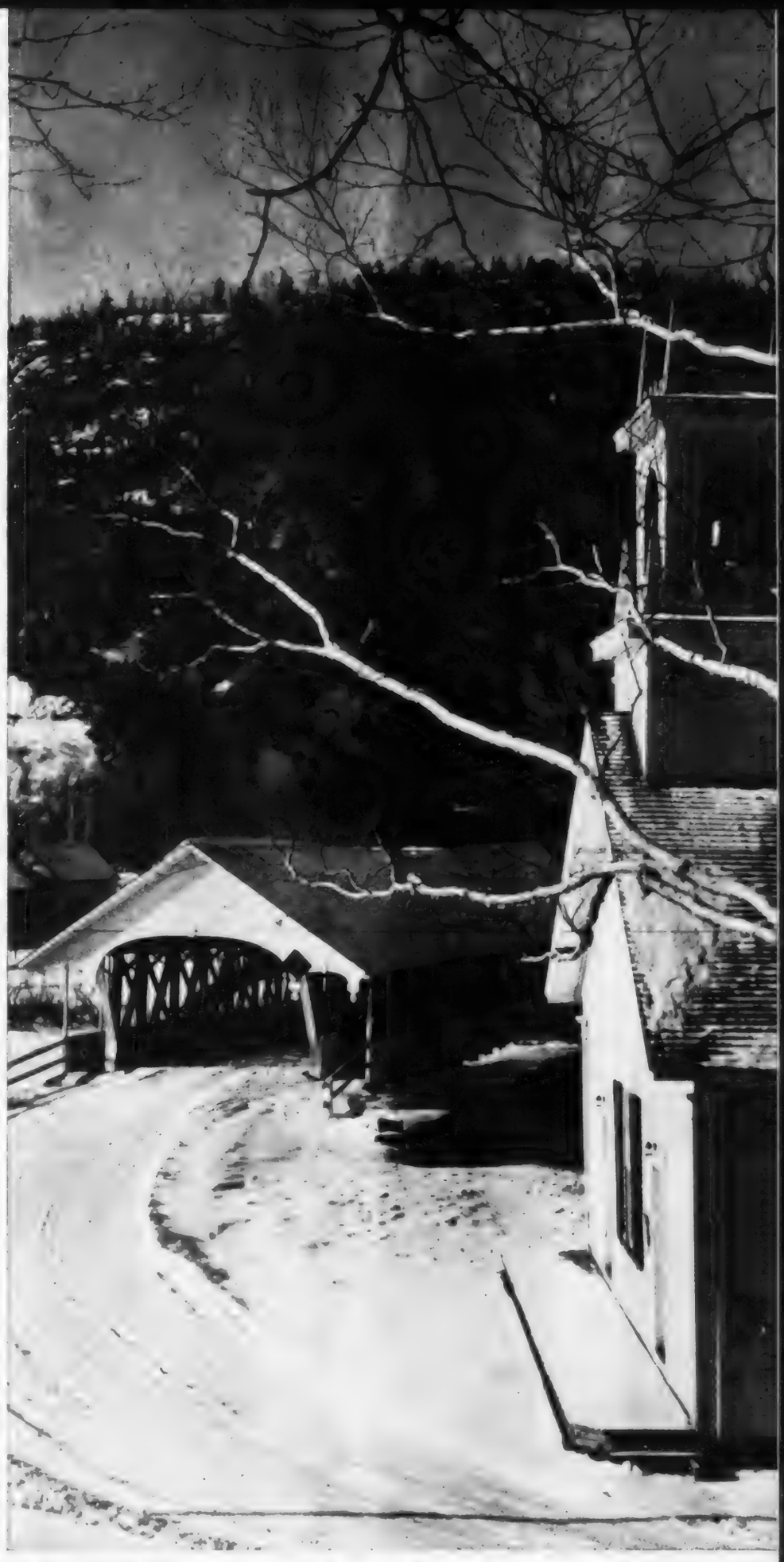


THE TOLL COLLECTOR usually worked on the side of the Lord on Sunday morning, allowed church goers to pass without paying. This bridge stands at Stark, N. J.

THE SPREADING TOES and the swollen foot are the first symptoms of Foot Rot.

FOOT ROT

BY DR. J. W. BAILEY

Muddy barnyards in late fall and spring are breeding spots for the Foot Rot germ. Serious decline in milk production can result from this common ailment.

A FRIEND of mine, also a veterinarian, has a story that he likes to tell when he is called out to work on a lame cow. It concerns the dedication of a giant telescope that had been built for a famous astronomer. A great crowd had been assembled for the ceremonies. When everything and everybody were properly settled, an expectant hush fell over the huge room. In full view of the crowd the professor mounted the observation platform. Bending down, he removed his shoes, and walked humbly to the giant telescope in his stocking feet. He peered thoughtfully into the shimmering glass and manipulated the machinery that swung it about the sky. Then he stepped down, and faced the crowd. "It's going to rain," he announced, positively.

"How can you tell?" asked a reporter, scenting a story.

"My feet hurt!" the great man answered.

With the story off his chest my friend goes to work on the cow, pointing out that if the cow could talk she would have complained long ago that her feet "were killing her."

Like human beings, cows don't like to walk when their feet hurt. If they have to walk anyway, they will hobble around, showing different degrees of lameness. Any one of the four feet may be affected, but it seems to us that most cases of sore feet in cattle involve the hind legs. Veterinarians sometimes suspect this is only an illusion, because it is easier for a cow to kick someone who is trying to doctor up a hind foot. There is no good reason why hind feet should be affected more than front feet.

Lameness in cattle may be due to any one of a number of things. It may be something like a nail or piece of glass that has been stepped on and forced deep into the foot. The leg may have been caught and twisted in such a way as to cause injury to an important muscle. A severe bruise may be causing trouble, or lameness may be due to a dislocated or broken bone. Lameness may be caused by any of these things, but the chances are pretty good that it won't be.

This is because lameness in cattle is almost always caused by a disease commonly known as foot rot. The medical name is pododermatitis.

When an animal has foot rot there are other symptoms besides lameness. A sore foot naturally hurts more if it is used, so affected cows are apt to put in a great deal of time lying down instead of moving around and eating. This in turn leads to other symptoms.

Without being able to walk around and eat as she should, it is not unusual that foot rot should cause a cow to grow thin and drop off in milk production. Even if ample feed and water are conveniently supplied, pain in the affected foot may be severe enough to keep an animal from eating as she should. In the event that she does eat, the infection is often serious enough to get into the blood stream and cause general sickness. When this happens the cow loses weight and decreases in milk production just the same as if she had not been eating. A little figuring will show that it's about as easy to beat foot rot as it is to win from a slot machine.

A crippled cow, being unable to defend herself or get out of the way of more active animals, is also likely to keep at some distance from the rest of the herd. Eventually the combination of lameness with other symptoms catches the attention of the

owner who then decides to have a look at the sore foot.

When the cause is foot rot, which it probably will be, it's pretty hard to predict just what he will see. Depending on whether a front or hind foot is involved, the leg may be swollen clear to the hock or knee. The swollen area is painful and warm to the touch. Along with the swelling, there is apt to be a pronounced spreading apart of the toes on the affected foot, and in most cases there is a particularly offensive odor arising from between the spread toes. There may be raw sores and pus around the top of the hoofs, or there may be no sign of infection other than the swelling and a slight reddening of the skin.

If the foot is picked up so that the bottom may be examined, there is the same uncertainty in regard to what will be seen. There may be a stinking wound and rotten flesh and pus pockets, or there may not be so much as a tiny crack evident anywhere. A case of lameness and swollen feet with no evidence of wounds is apt to be diagnosed as sprains or bruises. Take time to investigate when lameness appears in your herd, for foot rot can appear without the slightest sign of decaying flesh in the feet. The name "foot rot" isn't always an accurate descriptive term.

We can be definite about the symptoms of foot rot but not about the cause. Authorities aren't too well agreed on the cause. However, we'll stick our neck out a few feet and go along with the majority that believes a bacterium with the name of Actinomyces necrophorus is the villain in the case. Aside from being the most likely cause of foot rot in cattle, this germ is interesting because of its private life and habits.

It is one of our commonest germs, but it won't live very long in air. In fact, the less air the better for this bug. In addition to being partial to airless quarters, it likes them dark and wet, an amazing set of requirements for good health, even if it is a germ. Bacteriologists call such organisms "anaerobes", and there are quite a few of them besides A. necrophorus.

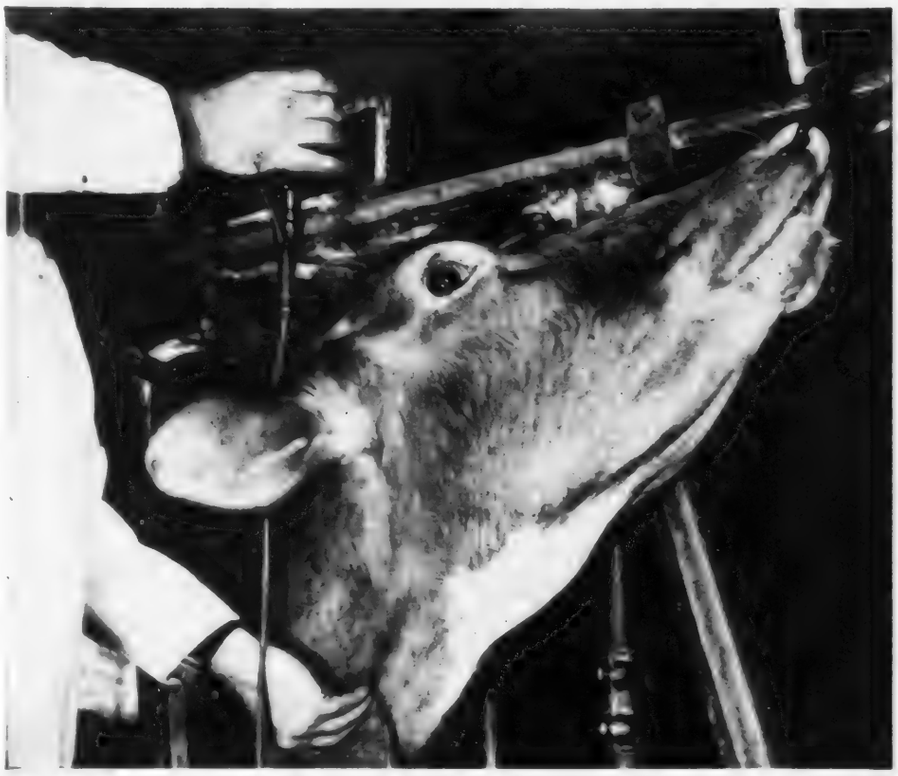
Another thing that sets this germ apart from most others is that it produces more than one disease. Next to foot rot in importance is the one that attacks the mouths and throats of calves and is known as calf diptheria. In addition to this one, it is constantly teaming up with diseases like bullnose in pigs, bumblefoot in poultry, and stomatitis in various animals to cause still more trouble. Wherever an injury occurs to break the skin or lining of the body cavities, this organism is apt to move in and cause all kinds of complications, either alone or in company with other bacteria. That's the way foot rot starts—from a scratch or cut.

At first glance it would seem that there shouldn't be many of these germs around to get into wounds. After all, a germ that dies in fresh air shouldn't be too abundant

(Continued on page 125)

PREVENTION is cheaper than calling the vet after Foot Rot moves into the herd.

INTERVENOUS INJECTIONS of sodium sulfapyridine cure about 98 per cent of all cases.



BECAUSE NATURE'S sprinkling is uneven this farmer has set up his own rain maker. Portable overhead irrigation systems cost from $60.00 to $100.00 an acre but usually pay for themselves in increased yield within the first three years they are used. The water may come from wells, ponds, lakes, or streams. The irrigation equipment distributor helps plan the system and fit it to the farm.

Fair Weather Rain

A farmer can fertilize, cultivate, weed and worry, but if his crops get thirsty his yields drop. A growing number of farmers are finding that they can insure profits by irrigation.

A GROWING plant has a thirsty root. It spreads its roots in the soil, prospecting for moisture to keep ahead of the rate of evaporation. The nourishment it takes from the soil can only be taken in solution, and if there is a water shortage the plant dies of a combination of thirst and hunger.

In the Midwest, however, with 30 or more inches or rainfall annually, water should be adequate for all crops, and it would be except that nature keeps very irregular sprinkling schedules. A good soaking rain in October does little to pull a field of corn through a drought in July. Growing plants need the water at the proper times. To tide his crops over the times when whimsical nature withdraws her support the Midwest farmer has, within the past few years, been taking a close up look at equipment for making artificial rain.

Farmers who have tried irrigation are sold on the idea. Many truck gardeners report they have paid for their irrigation systems the first year they used them. Dairy farmers have increased milk production enough to pay for irrigating their pastures in one year. John Carson, who farms near Knoxville, Tennessee, draws irrigation water from the Little Tennessee River. Recently he started irrigating his pasture. His increase in milk checks from his 150 cows completely paid for the system the first season he used irrigation. His investment was $2300. Ben Clark is a neighbor of Carson's. Clark uses an irrigation system on hay, pasture, and corn. He usually has a barn full of hay left when spring comes because the water he uses on his pasture gives his beef and dairy cattle good grass for several additional weeks each year. With the aid of irrigation he has increased his yield of field corn 25 bushels to the acre. Clark says, "With my general farming program I should pay for my irrigation equipment in three years, but if it required five years I would still consider it a good investment."

Man-made rain has had some of its most spectacular success on truck garden crops and especially on potatoes. H. R. Talmage started some years ago to irrigate his 200 acre farm at Riverhead, Long Island. His yields jumped until he was harvesting 50 per cent more potatoes and cauliflower than he had harvested before he could give his crops a drink on a dry day. The story is the same all over the country. Farmers from Oregon to Florida are finding that extra water is one way to increased income.

Irrigation is nothing new. It has been a farmer's tool since the Babylonians built an irrigation canal through their arid empire 4000 years ago, and brought prosperity to a desert people. Three hundred years before the coming of Christ the peasants of India built their own version of the farm pond and ran irrigation ditches downhill to their croplands. And just as ancient are the remnants of irrigation systems built in Peru, half a world away, long before the Spanish gold rush.

Although irrigation agriculture is time tested by centuries of use, we are busy today searching out the best methods of carrying water to our crops, making the system fit our highly developed agricultural practices, and adapting it to new climatic conditions. Modern irrigation experts face many of the same problems that confronted the ancients. The problem is to get the right amount of water to the right crop at the right time.

There are several types of irrigation, including open ditch, used primarily in the West, flume, portable and permanent above-ground systems. Each has its advocates but the one that has sparked the recent interest in artificial rain making is the portable system which can be carried from field to field.

Some of the advantages chalked up in favor of portable irrigation are: (1) it can be used on either level or sloping land; (2) it can be used as a weapon to fight frost; (3) it requires less space and less water than open ditch irrigation; (4) water can be applied at a slow rate to protect the soil from erosion; (5) the system can be removed from the field to permit plowing and cultivating; (6) fertilizer and sprays can be applied as liquid through the irrigation pipes.

Farmers are irrigating everything from alfalfa to onions, and blueberries to sugar beets. Before they went into the thing, however they did a lot of thinking, planning, and asking of questions, for an irrigation system is a large investment.

Where To Get Water

Logically enough the first factor to consider in an irrigation system is the source of water. Irrigation water comes commonly from three sources, wells, streams and farm ponds. Streams which never go dry are the best source. Wells that tap a good vein are second best, but expensive. Ponds are serving the purpose on many farms, but in dry years they are often empty before the crops get all the water they need.

As a rule of thumb in using ponds as sources of irrigation water, a minimum of one and a half acre feet of water should be stored up for every acre irrigated. For example, a one and a half acre pond with an average depth of five feet would have a storage capacity of seven and a half acre feet of water, which would irrigate

MUCKLAND truck gardeners have used permanent overhead irrigation for several years. This is a good way to water crops but the pipes are obstacles to machinery.

THIS PUMP can be wheeled from field to field as the need arises. The life expectancy of a pump is about 10 years depending on its care and the work it must do.

five acres. Where the pond is fed by springs or creeks the water supply will be replenished throughout the summer and the storage capacity can be less for irrigating the same acreage.

Wells drilled especially for the purpose of irrigating crop land add to the cost of the irrigation system. The cost of drilling increases with the depth of the well, and deep wells require more expensive pumping equipment than do shallow ones. Before calling in a driller the farmer should first search out the opinions of local water authorities. County agricultural agents usually know the reliable well drillers in the community, and can often direct farmers to those men who have drilled successful irrigation wells for other farmers.

Once the farmer determines that he has the combination of water, soil, crops, and markets to make good use of irrigation. he delves into the subject of equipment. Here he will immediately run into enough variables to stump a quiz kid. From a maze of couplers, sprinklers, pipes, and pumps, the farmer must purchase the best combination of equipment for his job. The distributor of irrigation equipment is well equipped to help him with his shopping.

No two irrigation systems are exactly the same. Every farm presents a new set of problems. Irrigation is one practice that has few rules of thumb. It's a matter of sizing up the situation and building a complete irrigation system to fit the farm landscape and the farmer's needs.

An irrigation system is composed primarily of four parts, the pipe, the pump, the sprinklers, and the couplings to hold the pipes together. The two common types of portable pipe are steel and aluminum. Both have advantages and disadvantages. Aluminum is more expensive, but is light enough that a ten year old boy can move a 20 foot length of four inch pipe. A man can carry two or three of them, thus cutting down the labor requirements for moving the system, and labor is one of the major expenses in irrigating. Steel. on the other hand, will take the knocks. A steel pipe can be banged against stones, or even run over with the tractor without suffering much damage. It is generally galvanized to cut down damage from rust. Pipe comes in 16, 20, and 30 foot lengths, and in a wide range of diameters.

Some pipes come complete with coupling attachments, but generally the couplers are separate equipment. One popular coupler is self-fastening and can be unfastened by twisting the pipe. Rubber connections on some couplers permit bending the pipe line at the joints without purchasing an angled coupler.

The several manufacturers building pumps for irrigation offer a pump to fit every need. The two types of pumps are centrifugal and turbine. Turbine pumps

THE SPRINKLERS may provide a place for cows to cool off, but their big job is to help keep the stock well fed. Pasture irrigation helps keep grass lush during mid-summer. Pastures should get two to three inches of water every 10 days.

are needed for deep wells where the water must be lifted more than 15 feet.

Sprinklers

Revolving sprinklers are the most popular equipment for throwing water out over the growing crops. They are made in several sizes, from small ones covering a 30 foot circle to a giant model that will sprinkle between two and three acres for each move. The nozzles and arms of the sprinklers are built to force the water out in an arch so that it falls on the growing crops like a gentle rain. The force of the water keeps a small driving arm banging against the body of the sprinkler and driving it around to sprinkle a complete circle.

For some low growing crops sprinklers are attached to the pipe directly, but for higher crops they are set on risers, or pipe extensions, to lift them so the water will be thrown out over the crops rather than into them.

The size of the nozzle used on a system depends on the area to be irrigated, the labor available for moving pipe, and the amount of water and pressure that can be called into service.

Another less popular type of sprinkling equipment is perforated pipes which requires no sprinklers and will work at low pressures.

The four component parts of an irrigation system are each manufactured by separate factories, and the equipment distributor is usually a distributor for at least four manufacturers. The component parts come into his sales room and he assembles them into complete systems, choosing the parts carefully to give the farmer what he needs for his particular situation. Most distributors are well versed on portable irrigation and are capable of going over the farmer's land and helping him make sound plans. When the farmer decides to irrigate, he contacts the distributor, who helps him solve his problems of layout, choice of equipment, and water supply.

When George L. Borg of Delevan, Wisconsin, decided to irrigate part of his pasture land he called in John Oldfield, who distributes irrigation equipment in Ohio, Indiana, and Wisconsin. Borg explained to Oldfield that he wanted to irrigate a 20 acre field of alfalfa-brome pasture. He hoped irrigation would provide insurance that his milk cows would not slump in production during the hot, mid-summer months.

Borg is lucky enough to have a lake as a source of water. He needed no supplemental well. He wanted Oldfield to survey the situation and plan the best system for irrigating the 20 acres. Oldfield went over the field with his engineer, then worked out detailed plans for the job.

When the field was finally ready to be watered by artificial rain there was one main pipe line down the center of the field and two laterals reaching from the main toward the sides of the field. The portable pump was set up at the edge of the field nearest the lake. The main four-inch, aluminum, 1,000-foot line was run the length of the field. Two 400 foot lat-

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THE FARM *that Pasture Built*

BY GEORGE LAYCOCK

IF the cow that jumped over the moon had paused to look down on Gallia County, Ohio, she would likely have chosen as her landing field the 240 acre farm of Ralph Davis. On the way down she could have sized up the countryside and picked out the Davis line fences without a second look. Davis has a green farm surrounded by brown hills. His pastures are knee-deep on a Hereford steer from early spring until late fall. But on most of the land around him, his neighbors grow poverty grass, dewberries, and broom sedge on eroded hillsides that were farmed and abandoned.

If Davis' purebred Herefords could jump over the moon they wouldn't, for in their home pastures the grass is always greener.

As this issue of *Farm Quarterly* reaches you, autumn is at hand. Some farmers have been feeding their stock supplementary forage for several weeks. Yet Davis will keep his cattle on pasture until snow flies, and the pasture will be good enough to keep his cattle satisfied with their menu and Davis satisfied with their gains. In

THESE DAIRY CATTLE, knee deep in nothing, either get supplemental barn feeding during mid-summer, or disappoint the milking machine. One of the best hot weather pastures is an alfalfa-brome mixture like those Ralph Davis started on his gullied fields.

the winter of 1948 he pastured his cattle until Christmas day. They were off pasture only four months during the year, largely because the fall pasture was adequate. His method of managing pasture for late fall feeding is simple. What Davis has done can be done on most Midwest hill farms.

Davis did not start with green fields, purebred stock and cash in the local bank. His fields were gullied and the top soil was thin. Except for a run-down farm house there were few buildings on the place. Fences were in poor shape. He had scrub livestock that wasn't thriving. He had borrowed money to get started.

Davis' father had purchased the original 120 acres about 1900. He died when Davis was 10, and Davis' mother managed to keep the place going until he quit school at the age of 16 and took over the farm for himself.

It was in 1930 that D. R. Dodd, the extension agronomist at Ohio State University stopped at the Davis farm. "When I first visited the farm in 1930," Dodd said, "it was a pretty hopeless mixture of broom sedge, poverty grass, and gullies. Davis was making a little progress, but he wasn't satisfied. He wasn't getting the results he had hoped for." Dodd walked over the fields testing the soil, and studying the contour of the slopes. He saw Davis was having trouble keeping the top soil on his corn and grain fields. Davis was spending his time and money getting his crop land in shape and letting the pastures take care of themselves. Dodd pointed out that the emphasis was going in the wrong places. The whole farm had a carrying capacity of only 17 animal units, when an animal unit is considered as 1,000 pounds of liveweight.

"You'll always have a hard time of it if you try to compete with level land farmers on corn and wheat," he said. "It looks to me as though you had better get started on a pasture program." Davis has been following that bit of advice ever since.

The next year he limed and spread superphosphate on one field in quantities which the soil tests said the field needed. His plan called for treating the other fields as fast as he could raise the money.

Two years later Dodd stopped back for a check-up. He found Davis leaning on the fence talking with a cattle buyer who was offering a premium of one cent a pound for the prime stock Davis was selling that year. That year Davis had 16,000 pounds of beef to sell, which meant an additional profit of $160 because of the premium. He chalked the premium up to his improved pastures and a bit of work with a pencil and scratch pad showed him that he had already taken in as much extra money from the improved pasture as he spent improving it. In addition, he figured that he would have raised much less than 16,000 pounds of beef had he not done some pasture improvement.

RALPH DAVIS took his father's run down hill farm and turned the gullies into grassland. His purebred Herefords bring premium prices.

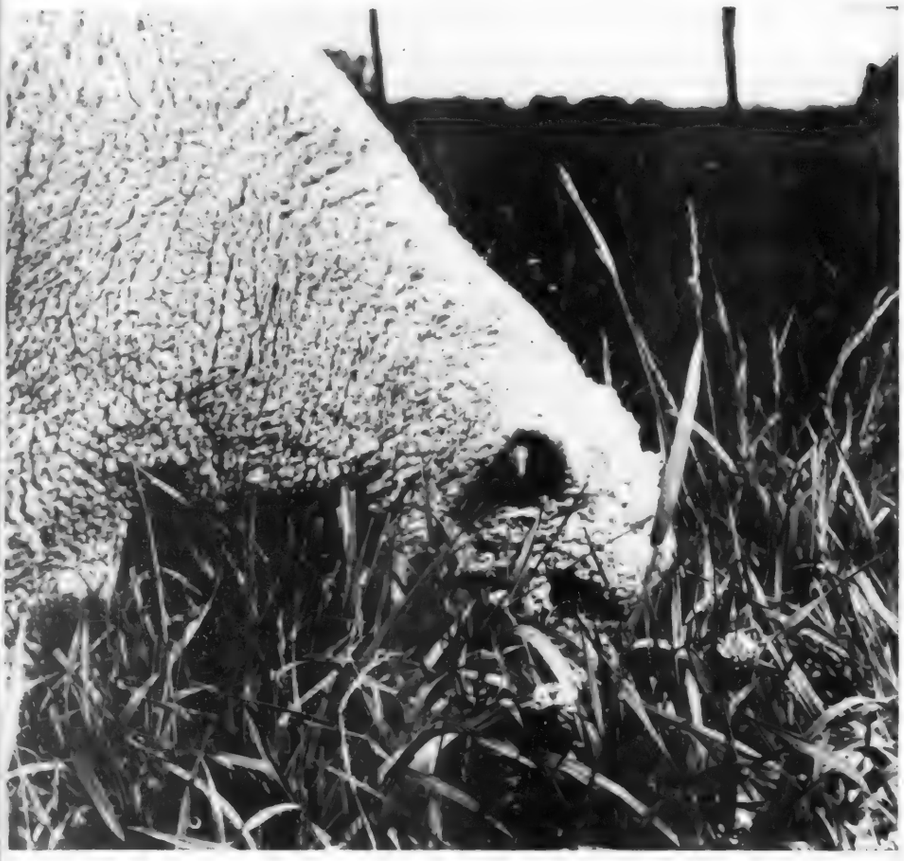
He has continued to build up his pasture, field after field, until today every field on his farm has felt the wheels of the manure spreader and the fertilizer and lime drill. Since 1930, all of his land has been treated with four or more tons of lime, 1,000 or more pounds of superphosphate plus some potash and manure.

There was no need for Davis to rebuild all his pasture land in one year. The pasture would have gone to waste, for he wouldn't have had money enough to buy stock which would harvest the grass and legumes. He rebuilt his pasture about as fast as he could finance the purchase of livestock to take advantage of it.

Farmers who find themselves short on summer pasture and have a herd of cattle to feed usually take one of several ways out. Some have to sell part of their herd rather than let them go hungry. Others may barn feed in summer. Some carry a light load of stock until mid-summer, letting the pasture get a head start, then let the stock in during hot, dry weather when pasture growth is slow. "This," says Dodd, "is bad business. It wastes a lot of pasture, for you get the most good out of pasture by harvesting it when it is young and succulent." The solution is to have no gap in the pasture supply. A mature cow can consume 100 pounds of green feed every 24 hours. She should be able to get her 100 pounds in eight hours and have 16 hours left for rest and chewing.

When Dodd first sat down with Davis to outline a plan of attack, he suggested two possible ways to rejuvenate the worn out hills. The two methods, surface treatment and trash mulch seeding, are the ones used by most Midwest hill land farmers.

Livestock needs good feed the year around. They don't lose their appetites during mid-summer when the common blue grass, white clover pastures are in a slump. Especially with dairy cattle is supplemental mid-summer pasture important,



SHEEP do well when they're head deep in good pasture. Davis' plans include sheep because sheep and cattle make a good forage harvesting team.

for without it the blue grass goes into a slump and the milk production may follow. If cows go off their milk in mid-summer they don't get back on good production until the next lactation. Good mid-summer pasture becomes insurance to the livestock farmer, and especially so to the dairyman.

It was to fill this need for mid-summer pasture that agronomists worked out the trash mulch plan and pasture combinations which do much better during the hot summer months than blue grass. One of the most common mixtures in the Midwest is alfalfa, brome grass, and ladino clover. To get this seeding down on rolling land without allowing the top soil to wash away, the field should be trash mulched.

Trash Mulch Pastures

Davis knew from the gullies on his farm that plowing his steep hillsides was dangerous practice. He could turn the soil over and before he could get a crop established a heavy rain might wash seed, soil and all down the slopes, and leave him poorer than he was to start with.

To dig up the hillside and leave the chopped vegetation in the top few inches of soil, Davis used his tractor and a spring tooth cultivator. He did most of his trash mulching in the early spring when there was moisture enough to make the soil work up well. He kept his machinery on the contour.

Davis knew that working up a field doesn't increase its fertility. With the help of Dodd he tested his soils and determined the amounts of lime and superphospate they would need to grow the crops he wanted.

Before he moved his machinery onto the field, lime went down at the rate of two tons to the acre. It should be applied as far ahead of the machine operation as possible, and a year in advance isn't too long. The phosphate can be applied with a drill at the rate of 300 to 500 pounds to the acre after the seedbed is prepared; then worked in with a harrow. Some fields are short on potash and to get pasture faster than it normally would come with only lime and phosphate, an 0-12-12 fertilizer can be drilled at the rate of 500 pounds to the acre to supply both potash and phosphate.

Davis decided to plant alfalfa, brome and ladino. He seeded them at the rate of eight pounds of alfalfa, ten pounds of brome grass and one-half pound of ladino per acre in the first half of March. One common variation from this formula is to replace three pounds of the brome grass seed with two pounds of red clover.

After the seed was down Davis ran a culti-packer over the fields along the contour.

"That first field came along fine," Davis said. "My pasture plan was started, but there was still a lot of work to be done. The trash mulch seeding was only to supply mid-summer feed, which is the big shortage on most farms with permanent pasture. What I needed then was to start rebuilding more of my permanent blue grass and white clover pastures because even at their best they weren't anything to take pictures of."

Of Davis' 240 acres 80 are in cropland. This includes all the grain, hay and corn he grows. The other 160 acres are made up of 140 acres of pasture and 20 acres of woods. He has used the trash mulch method on 25 acres which will easily carry his stock over the mid-summer slump in blue grass pastures. That left, however, another 115 acres to be brought into good production. Even if Davis had wanted to put it all in by the trash mulch system he could hardly have afforded it. He figures that trash mulching cost him about $25.00 an acre. Today it would cost $50.00.

Davis sized up the expense item and decided that he could get into serious financial troubles by trash mulching too much of his pasture. He knew that it takes a little longer for a pasture to become a banquet table for livestock by surface treatment, but he knew that it was a cheaper method. "This surface treatment idea holds a lot of promise for the farmer," Davis says.

The surface treated pasture is generally only limed and fertilized. It may or may not be seeded to blue grass and white clover. Surface treated pasture usually makes up most of the rejuvenated pasture land. These fields, even if they are not seeded, will produce good blue grass and white clover forage within a couple of years after they are limed and fertilized.

The steps in surface treating a pasture are simple. First comes lime. As a rule of thumb lime should be applied to hillside fields at the rate of two tons per acre. Soil tests will reveal whether or not they should have more lime. After he had applied the two tons of lime, Davis drilled 500 pounds per acre of superphosphate. After that it was a matter of waiting. It takes a surface treated pasture about two years to come into good production. The change is not spectacular and the time lag between spending and the cashing in seems long.

Perhaps a year can be cut from the wait by scratching the field with a spring tooth harrow and seeding it to blue grass, ladino and white clover. If the farmer prefers not to reseed the pasture, he can, like Davis, wait for it to reseed itself. Both the blue grass and the white clover will come in without seeding once the fertility of the field is brought up enough to give them the growing conditions they need. If the field is seeded it should get a mixture of four pounds of blue grass and one half pounds each of white clover, and ladino to the acre.

In addition to the lime and fertilizer which Davis applied to his fields he treated his pastures every two years with manure from his feeding pens.

Davis knows that there is more to

managing pasture than bringing it into production. If it is to continue to produce year after year indefinitely the treatment must be repeated. He has gone over each field every five years and spread another 500 pounds of superphosphate and another two tons of lime, on both his surface treated and his trash mulched fields.

What Has It Cost Him?

Davis figures that he has spent about three dollars a year to maintain his pasture in top condition. Over a period of 15 years he spent $16.00 per acre for lime and $22.50 per acre for fertilizer. With his labor figured in the cost comes to about three dollars per acre per year.

To determine whether or not it pays to spend three dollars a year keeping pasture in shape, Davis had to consider the difference in income from those acres of improved pasture and what unimproved pasture would have made for him.

Several states have run experiments which show that an acre of unimproved pasture will produce about 100 pounds of meat a year. Experiments also show, on the other hand, that good pastures like those which Davis now owns will produce about 300 pounds in the same period. Dodd says, "Let's figure roughly that the beef will sell at 15 cents a pound which is $45.00 from each acre. That's not all profit. You can figure that buildings, fences and taxes cost about $12.00 per acre. Lime and fertilizer will cost around $3.00 more which leaves a profit of $30.00."

The talley sheet for the farmer working with unimproved pasture can show a profit but not a fancy one. For the 100 pounds of meat which he grows he receives $15.00 He may point out that his pasture didn't cost him anything, but actually he still had to spend about $12.00 an acre during the year for taxes, fencing, and buildings for the farmer's family and livestock. This leaves him an annual profit of three dollars an acre. As Dodd said to Davis, "If you have 1,000 acres that's a profit of $3,000, and you can probably live on $3,000. But, do you have 1,000 acres?"

The recommendations Dodd made for the Davis farm are not the only methods that work well in pasture rejuvenation. In rebuilding a pasture, like spending money, there are many methods. Each state has recommendations that vary somewhat from those of its neighbors.

Kentucky pasture experts point out that in the central blue grass region of Kentucky blue grass pastures usually deteriorate because of either under-grazing or over-grazing. All they may need in this case is to use livestock properly to harvest the grass and not damage the pasture.

Iowa believes that a permanent pasture should have some help from temporary pasture crops in early spring and late fall. Winter rye or Balbo rye is their suggestion for the job. The Balbo is a favorite among dairymen, but winter rye can be pastured by milk cows if the animals are removed about three hours before milking time each day.

In Kansas, where most land is level and rich in minerals, according to the Kansas State College, the first step in rebuilding an old blue grass pasture would be to rip up the pasture and plant something more productive than blue grass. They suggest brome grass with some legume such as alfalfa, sweet clover, or perhaps red clover.

Level Land Pasture

The problem of pasture management that Davis faced is considerably different than that confronting farmers who work level land. Where there is little danger of erosion, pastures are worked right into the

(Continued on page 133)

THIS FESCUE pasture has been under-grazed. The grass gets tough and unpalatable with age. Fescue should be grown in combination with ladino or another legume to build soil and provide better forage. Fescue unlike blue grass does not have a mid-summer dormancy.

MINNESOTA NO. 1, the best known of all the "inbred" closed lines, is now producing pork for markets all over the country.

THE NEW LOOK IN HOGS

BY ALFRED H. SINKS

PIGS may be pigs to the city man whose closest acquaintance with a hog is made when he pokes his fork at a slice of bacon, but many a farmer knows that one pig may differ from another, even in the same litter, as much as a Hottentot differs from an Eskimo. It may be those differences, and the uncertainty about them at farrowing time, which mean profit or loss to the farmer when he tots up his feed bill against the price his animals bring on the market.

If he could get rid of those uncertainties he'd be a happier, and a richer man. Suppose he could answer these questions in advance: (1) How many pigs can I expect per litter and how many will be left at weaning time? (2) Will they run to a uniform size, or will there be runts? (3) Will there be a lot of big eaters and slow gainers? (4) Can I count on their reaching a market weight of, say, 225 pounds, at just about the same time? (5) Will they dress out as top quality carcasses, assuring a top price?

If he could know all those things ahead of time it would take most of the risk and disappointment out of the hog business. The answers are nearer than we may think. Scientists in at least three places have gone a long way toward showing what causes uncertainties in raising hogs and what can be done to get rid of them. Many farmers already profit from this new knowledge. And within a few years it will mean as much to the housewife who buys the pork as it means to the farmer now.

It is no accident that the housewife who likes her bacon or her loin chops lean cannot always buy them that way. According to research men at Beltsville, Md., at Miles City, Mont., and at St. Paul, Minn., a lot of good hog feed that today is producing lard—at a low price per pound—might just as well be producing good, lean meat instead. The difference is in the kind of hogs you start out with.

When that idea takes hold on American farms, more and more packers will find it worth the trouble to pay for quality instead of gross yield. (Gross yield

means that proportion of the carcass which is usable, usually about 72 to 80 per cent of the live weight.) The farmer who doesn't go along with the new look in hogs will discover his biggest, fattest, costliest hogs are bringing a low price per pound.

To appreciate the new look in hogs you have to discount generations of thinking on the subject. Big, over-fattened hogs still draw blue ribbons at county fairs, and to many a farmer it is a matter of great pride to be able to produce the biggest, fattest hog in the neighborhood. That may be the way to win ribbons at fairs, but it's not the way to make money in the feedlot.

To the farmer who raises hogs, not for fun but profit, the fat hog is a snare and a delusion. He may be as extinct as the dodo bird in a few years, for he eats a lot of expensive feed and pays his owner back in the deflated currency of cheap lard. The importance of this is far greater than most people suspect. Hogs bring farmers nearly a third of their total annual income. In addition, nearly half of the corn we raise finds its way to the consumer in the form of pork. So does a huge quantity of other farm products. An improvement in the general economy of hog husbandry would affect, not hog raisers alone, but other farmers as well.

The average farm hog reaches the market at a live weight of around 200 to 250 pounds. Only about 43 to 45 per cent of that total consists of the five "primal" cuts: bacon, ham, shoulder, butt, and loin. About 20 per cent is waste, and the rest consists of cheap cuts and lard. If you could count on permanent high prices for lard that might not be so bad. But vegetable oil products are rapidly cutting into the demand for lard, a clear danger signal for every farmer who raises fat hogs.

Meantime the experts have been working quietly to develop new types of hogs that would answer these problems. They have developed new blood lines that, at six months of age, average as high as 47 to 50 per cent of the choice cuts. That means upward of ten pounds more per animal of the stuff the packers are paying their highest prices for. And the meat itself is leaner in texture, higher in quality.

It may not add up to a lot on a single hog. But when a farmer can market 50 or a hundred such hogs—each one tipping the scales at close to 225 pounds, it

THE HAMPRACE HOG

PRODUCTION RECORDS FOR LITTERS FARROWED FROM 1939-1947, INCLUSIVE

Year	Number of litters	Average number pigs farrowed per litter	Average number pigs weaned per litter	Weight of litter at 56 days (pounds)
1939	2	13.0	9.5	253.5
1940	4	11.0	8.3	202.3
1941	22	10.1	8.3	221.0
1942	43	9.8	8.2	242.9
1943	39	10.5	7.9	215.5
1944	37	11.2	8.5	261.3
1945	15	9.5	7.3	269.5
1946	38	11.5	8.1	268.6
1947	45	10.8	8.1	264.6
		Average 10.6	8.1	248.4

AVERAGE DAILY GAIN AND FEED EFFICIENCY

Year	Number of pigs	Average daily gain	Average feed per 100 pounds gain
1942	44	1.44	339
1943	80	1.43	362
1944	64	1.41	394
1946	80	1.46	359
1947	72	1.40	352

FIVE HAMPRACE SOWS and their litters. Note the uniformity and vigor of the pigs. The new strains are not only bred for leaner and faster growing meat, but for litter size, vitality, and the maternal qualities of the sows.

DANISH LANDRACE hogs, imported in 1934, for crossing with U.S. domestic stock.

A BELTSVILLE CROSS, 75 per cent Landrace and 25 per cent Large Black, an English breed.

LANDRACE-POLAND CHINA inbred gilts; 75% Landrace and 25% Poland China.

can mean, if the improvement were general, a bonus of more than $100,000,000 a year to American farmers. This would be counting only the increased market value of the hogs sold. It does not include the more economical use of feed, or the advantage of a breeding program which eliminates uncertain performance.

Among the experts of the Department of Agriculture's Bureau of Animal Industry at Beltsville, interest in this problem goes back more than 15 years. Even before that they had a pretty clear picture of what the ideal hog ought to be.

None of the standard breeds recognized in this country seemed to fill the bill. Six of those breeds were of the so-called "lard" type, and two of the so-called "bacon" type. Both types fall short of the ideal hog; the kind of animal which would bring the farmer the highest return for his time and money.

Much could be done, perhaps, to improve the standard American purebred types by selective breeding of individuals. Much was already being done along those lines by professional breeders, and at various state experiment stations. But from the point of view of the scientist, all these breeds had one serious fault, none of them had performance records clear or complete enough to serve as the basis for a scientific breeding program.

For centuries stock breeding was a rule-of-thumb affair. Only in the past few years has it approached an exact science. The word "genetics" itself is less than half a century old, and only by the use of genetics can you predict what kind of offspring any mating will give. To do this you have to know a great deal about the characteristics of the parent stocks and one should be able to identify a number of the genes carried by those parent lines. "Genes," according to Prof. L. M. Winters of the University of Minnesota, "are the little *somethings* that are passed from parents to offspring which make certain attainments possible and other attainments impossible."

For a scientist, that sounds rather vague. But as a matter of fact "little somethings" is about as accurate a de-

THIS MINN. NO. 1 sow dropped 12 pigs a few minutes after her portrait was taken. She has 12 banquet size dinner plates.

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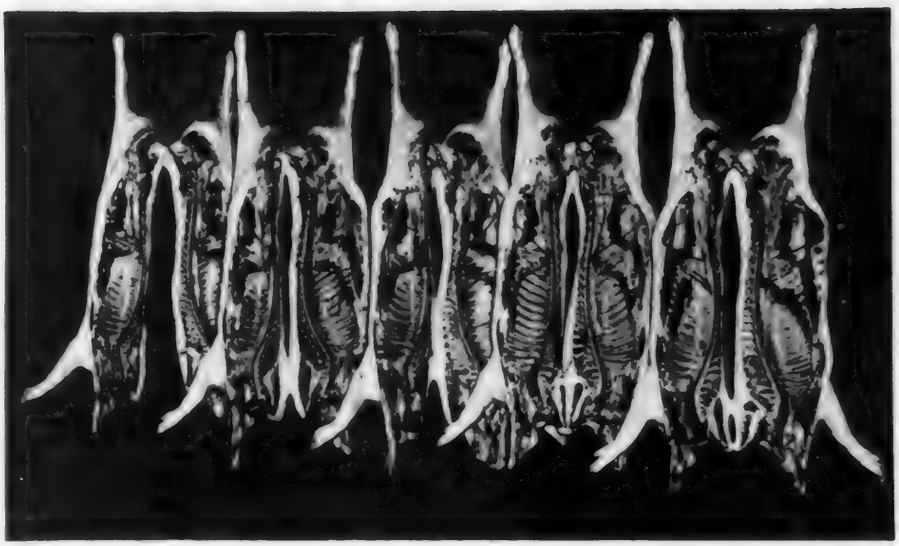
scription of genes as anyone ought to attempt. For genes are thought to be arranged along the exterior surface of a much larger body called a chromosome, like the kernels on an ear of corn. A number of these chromosomes in turn form part of a germ cell. And the germ cell itself is just about big enough to be identified under a microscope. Like an atomic physicist, the geneticist works with entities far too small to be seen. Hence he identifies genes by what they *do*, rather than by what they *are*.

He identifies them by carefully noting the characteristics which appear, or fail to appear, in each generation of offspring. He lists as many known genes as he can find in the parent stocks and, through careful selection and a long series of matings, winnows out the undesirable ones and brings the desirable ones together in new combinations that will *stay put*. The resulting animals may be, to all intents and purposes, a new kind of purebred. And this new breed may show characteristics which are amazingly different from those which you or I would be likely to notice in the original parent stocks.

To lay down a scientific breeding program for swine, the government geneticists needed to know what genes were present in the parent stocks. That meant finding parent stocks for which painstaking records of performances had been kept for many generations, and there were few such records in this country.

Furthermore, the Beltsville men hoped to develop a hog of what they called an *intermediate* type, and needed dependable parent stock of that type. They were looking forward to the perfect animal, the streamlined pig, the pig of the future. He was to be long in the "belly," which would mean a maximum of loin and of good, lean bacon. His chops were to be thicker, firmer, leaner. He should not have less than an inch and a half nor more than an inch and three quarters of back fat—just enough and not too much. A far bigger proportion of his carcass should cut up into the choicer cuts. A minimum should be fat, second rate cuts, and waste. In other words the experts had carefully considered the needs of farmer, packer, and the public. They were aiming to hand tailor a breed of hogs to fit those needs.



MINNESOTA NO. 1 carcasses on the rack. Note the uniformity of length and the thin back fat and bacon. These hogs were marketed at an average of 225 lbs. live weight.

The white Landrace hog of Denmark had many of the qualities they wanted. Furthermore the Danes had kept careful records of their breeding stock for many generations. You knew just what to expect when you mated a Landrace boar with a sow of that breed: the average number of pigs to the litter, average weight at weaning time, average rate of gain from weaning to market weight, and so on. This was the kind of parent stock a scientific breeder could expect to produce dependable results.

You might think all the Beltsville men had to do was order a few Landrace hogs and start in. But it wasn't so simple. The Danes had a good thing and they knew it. To get breeding stock our government had to sign some pretty stiff agreements. They had to promise that Landrace hogs would never be produced commercially in this country in competition with the Danes. But this was nothing to the difficulties the research men faced at home. Henry Wallace, as Secretary of Agriculture, had a big hand in the importation of the Danish hogs.

Each of our standard American breeds has its firm friends and admirers. From the standpoint of science, no one knows how "pure" any of these breeds really are. For each of them—like almost every variety of animal that walks the earth—is the product of "random crossings" which have taken place since the dawn of time.

Nevertheless the "purebred" idea is deep-rooted. If a "cross" should produce

(Continued on page 120)

AT HER FIRST farrowing this Montana No. 1 sow dropped eleven pigs; now at four weeks she has eleven at her side.

Broomcorn

The straw for your broom is grown as a cash crop on the Great Plains. It brings in more than corn, but harvest labor costs are high.

A STAKE truck, the springs flattened with the heavy load of round bales, pulled off the Illinois highway into a gas station. Before the driver could get out of the cab a car drove up beside him and a puzzled looking man leaned out and said. "OK I give up. What is it?"

"What?"

"Look, I've been following you for five miles trying to figure out what's in those bales. My friend here," he said nodding toward the driver, "thinks it is bullrushes and I say it's bamboo. What is it?"

The driver grinned, "Those are bales of broomcorn, mister. You're in the heart of the broomcorn country."

"Oh broomcorn!" the man exclaimed, as though he had half-way thought so all along; and then rather sheepishly, "What do they use that for?"

"Well it ain't to make vacuum sweepers out of," the driver answered with heavy sarcasm, but seeing that it was wasted on them, he answered, "Brooms, buddy, brooms. Like when you make like a housewife."

No poll has been taken, but it is safe to assume that it is only the rare housewife who could tell you where the straw on the end of her broom comes from. She knows that a straw jerked from the kitchen broom is excellent for testing cakes and her husband sometimes uses one to clean out his pipe, but her guess would probably be that the straw comes from India or the Orient. As a matter of fact, broomcorn is a domestic cash crop, important in Illinois, Oklahoma, western Kansas, eastern Colorado and part of Texas and New Mexico.

Broomcorn is one of the odd members of the sorghum family. Unlike the other members of this grass family its slender stalk is dry and tasteless and tough, and its seed head produces long thin branches that form a brush. Each of these branches divides and subdivides at the end to form off-shoots that support the seed. It is this divided straw that gives broomcorn brush the advantage over other fibers and plastics. Standard varieties of broomcorn grow seven to 15 feet tall; the dwarf types from four to seven feet. The plant looks like a tall but undernourished stalk of corn until the seed head is formed. After that it looks like a thin corn stalk in need of a haircut.

For decades plant breeders have been trying to produce a broomcorn that would yield both a brush crop and stalks and leaves suitable for syrup or forage. Several sweet varieties have been developed, but the quality of the brush suffered so much that the total crop was worth less than the brush crop from the standard varieties. Plant breeders, however, are

TABLING BROOMCORN at harvest time is done to permit the harvesters to reach the valuable seed tassel. Walking backward between rows, the men break the stalks diagonally in front of them to form a waist-high table. Later they cut the broom straw, or brush, from the stalk. Dwarf varieties are harvested without tabling.

GRADING THE BRUSH is like grading exam papers; no two are alike. Specialists from the U. S. Department of Agriculture spent ten years trying to set standard grades, but gave up when they found 320 different grades in a single bale from a single farm. Buyers go by length and courseness of the brush and by color. The box-like object in the background is a broomcorn baler partly filled with brush.

patient men and they are still trying to get away from the dry stalk. They are also trying to develop a variety resistant to root rot, the most troublesome disease of broomcorn.

The Curious Dr. Franklin

No one is certain of the date, but the story goes that sometime before 1781 Benjamin Franklin received an imported clothes brush from France. He saw that one or two seeds were still clinging to the fibers. Dr. Franklin, whose curiosity is legendary, couldn't let such an opportunity pass. He planted the seeds and harvested the first broomcorn grown in America. This frugal act was the beginning of a profitable new industry in the young country.

Levi Dickinson of Hadley, Massachusetts, planted a half-acre of broomcorn in 1797 much to the amusement of his neigh-

BROOMCORN JOHNIES work the harvest. A crew of 8 to 10 men prepare the brush for the thresher, a pair of tractor-powered, toothed cylinders. Off bearers carry the brush away to be shelved for drying. Harvesters say the chaff is nature's own itching powder.

bors, who felt that only a crank would think that he could supplant the split hickory twig brooms with straw. This first commercial crop produced 20 or 30 brooms and, in the years that followed. Dickinson expanded his acreage and turned out brooms by the hundreds. His Yankee neighbors were not slow to see the profit in the venture and Hadley became the center of our first broomcorn and broom-making industry.

Shrewd New England salesmen were soon peddling brooms all over the country. The Broom and Broomcorn News, a trade publication for the industry, tells a story of an early broom salesman, whose name was Lombard. Mr. Lombard had been having a very dull spell. In desperation he decided to take advantage of the prevailing custom of trading and barter. The next store he visited he received the usual "No brooms today, Mr. Lombard." "Better buy some," he said to the merchant. "I'll take half payment in cash and half in store trade." The merchant couldn't resist such an offer so the brooms were bought, hauled into the store and half the price paid in cash. "What will you have in store trade, Mr. Lombard?" inquired the merchant. "Why, sir, I'll take the brooms, sir!"

Broomcorn, like many other crops, moved westward in search of cheaper lands. From the land around Hadley, the center of production shifted to the Mohawk Valley of New York and then into Pennsylvania. From there it moved to the Scioto Valley in Ohio and still westward to east central Illinois around the towns of Arcola and Matoon. Though Arcola still calls itself the broomcorn capitol of the world, the area of greatest production today has again shifted west to around Lindsay, Oklahoma, and in a western area that covers portions of western Kansas, eastern Colorado, northeastern New Mexico, and northwestern Texas.

Broomcorn can be grown in any state. Its popularity in certain areas has been the snowball effect of a successful crop, and the subsequent centering of markets and buyers in that area. A single grower in any other part of the country would have a difficult time disposing of his crop. The farmers around Arcola, Illinois, say that if all but one of them stopped raising broomcorn, he too would soon have to give up the crop because the buyers would leave the area.

How To Grow A Broom

A sandy loam is considered the best land for growing broomcorn. The soil preparation is much the same as for corn or cotton: plowing in the fall or spring, depending on the preceding crop, and a thorough discing and harrowing.

The seed is planted with a corn or cotton planter equipped with special broomcorn plates. The rate of planting is much closer than corn, and varies according to the moisture available and the variety. In the Illinois and Lindsay, Oklahoma, areas White Italian is planted three to four inches apart in rows spaced three to four feet; Black Spanish (formerly called Black Jap until December 7, 1941) is planted a little closer, two and a half inches. In the more arid western region the spacing between plants is about double that of Illi-

nois since there is not enough moisture to support a thick nois since there is not enough moisture to support a thick planting.

The seedling rate is of great importance. "Most of the growers around here," says George L. Pfeifer, a big seed grower in Arcola, Illinois, "plant too thickly. The best brush comes from plants three and a half to four inches apart in the row. If they plant much closer they get short, spikey brust that doesn't have the quality, and they get less for the crop even though they may have a larger tonnage. Of course, if they plant too thin the brush will be long and coarse and they will get a lot of crooked heads, for which they'll be docked."

One of Pfeifer's customers who plants broomcorn in the approved way is Tom Pendergast, who farms with his six sons on the outskirts of Arcola. "I buy certified seed from George Pfeifer and have it treated with Cerasan before it is delivered," says Pendergast, who is no kin of the Kansas City politician. "In planting the seed we figure a bushel, that's 48 pounds, to 20 acres. You cultivate the crop just like you do Indian corn. I try to get in two or three cultivations before the plants get too big for machines. With the plants so close together in the row they usually choke out weeds pretty well once they get a good start on their growth. I'm usually one of the first to harvest around here. It isn't that I plant any earlier; I get my crop in around May 15 to June 10 the same as the rest of them, but I like to harvest a little greener than most. Most of them wait until the whole brush is well out of the boot, that's the last leaves on the stalk that curl around the brush, but I like to take the brush while the knuckle where the brush fibers join the stem are still an inch or two in the boot. I think I get a little better quality that way and what I lose in weight I make up for because harvesting is cheaper right at the start. Once I've got my crop in the boys and I are free to hire out to harvest the neighbor's crop. We don't trade labor around here very much, but we do help each other for wages."

Most Illinois farmers plant broomcorn in a four-year rotation with soybeans, wheat and corn. In the Oklahoma region they substitute cotton for corn. They usually fertilize for the whole rotation, trying to keep up the fertility with heavy application of fertlizer every 4 or 5 years and checking with frequent soil test.

Imported broomcorn has the doubtful distinction of having introduced the corn borer to America. Strangely enough this evil worm won't touch broomcorn if there is a succulent patch of Indian corn (the broomcorn grower's term for ordinary hog corn) around. The plant is subject to root-rot which seems to hit without rhyme or reason. One grower will have his whole crop wiped out and his neighbor will be free of it. Or it may strike only part of a field. Seed it treated with Cerasan to protect against root-rot but, as yet, not too much is known about the disease or its control. Though there is some doubt as to the effectiveness of seed treatment is combatting root-rot, the treatment does have a good effect in preventing smut which is the only other major disease that imperils the crop.

An average yield is around 630 pounds of brush to the acre. In 1948 a ton of brush brought from $375 to $450, which is considered a somewhat better return per acre than the average crop of corn or wheat, but broomcorn costs considerably more to harvest.

Harvesting Is A Headache

The 1948 crop of broomcorn amounted to 29,500 tons as compared to an average of 42,690 tons a year from 1937 to 1946. Weather conditions were excellent, the price has remained high and the demand is such that brush is being imported from Argentina and Italy. The answer to this contradictory set of facts lies in the difficulties of harvesting.

R. W. Rennels of Charleston, Illinois, turned on the seat of his idling tractor and pointed to the corn picker he had been drawing through his fields, "There is the reason so many farmers have cut down on their broomcorn acreage or given up the crop altogether. My sons and I can harvest all of our Indian corn by

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SHELVING THE BRUSH for two weeks drys and hardens it.

THERE IS A KNACK to hoisting the heavy bales of brush.

NATURE exacts a severe penalty when plants and animals get insufficient calcium.

There is danger in over sweetening the soil. Dr. Albrecht warns against destroying all acidity and reminds us that lime is essentially a plant food.

LIME UP TO DATE

BY DR. WM. A. ALBRECHT

FOR more than a generation now American farmers have been urged by soil scientists, agronomists and crop experts to apply some form of "limestone" to their soils to "sweeten" them. They were told that crops, with few exceptions, do better in an alkaline soil and, in theory, the "sweeter" the soil, the bigger the crops. Farmers learned a new term, "pH"; they tested the pH of their soils and applied limestone for the sole purpose of reducing the acidity. In the last few years some scientists have questioned this, insisting that limestone should be applied primarily as a plant food, and that some acidity is necessary to all plant growth. The time has come to get up-to-date on our thinking about lime because the yardstick by which we measure the need for lime has proven to be inadequate. For some crops, such as clover and alfalfa, the reduction of acidity is desirable, but complete alkalinity is not. And we should think of limestone as a plant rather than as a sweetener.

Chemistry Review

To understand why this is true let's review our high school chemistry under the chapter on calcium, or limestone, as it is known agriculturally.

Limestone is actually a hard salt, the carbonate of calcium. We can make it in the laboratory quite simply by dropping a piece of metallic calcium into a jar containing carbonic acid (soda water), or by putting our breath, which contains carbonic acid, through lime water. Nature created an abundant supply of calcium

TOO MUCH LIME can result in a crop failure. Some acidity is needed to release locked soil minerals for plant food.

carbonate, but she left us no instruction for its use on the soil. Consequently for many years as farmers we have used limestone with the wrong reason in mind.

Limestone and "lime" are not exactly alike. "Lime" is the oxide of metallic calcium, but since limestone and lime act so much alike in soil, what we say here applies to lime as well as to limestone. Limestone and lime are "Double Dealers". They do two things, and they do both at the same time. First, limestone puts calcium, a plant food, into the soil; second, limestone diminishes acidity or produces alkalinity. The putting of calcium into soil is a vital, necessary, and intelligent thing to do, but the so-called "sweetening" of the soil, or *complete* removal of acidity, is, in almost every instance, a wrong and costly thing to do. Limestone has the habit of removing acidity or adding alkalinity to the soil. We cannot break limestone of this habit of reducing acidity while supplying calcium.

At this point it will help us to understand the real purpose of limestone applications if we remember that farmers have always used limestone for its alkalizing ability, whereas credit should have been given to the calcium portion of the limestone for its crop-nourishing ability. We grow crops, but not just for the sake of the crops; we grow crops for the sake of their food value to human beings and animals which live on those crops. Humans and animals cannot live without calcium and the products it helps plants manufacture; therefore, we must see to it that our crops have the opportunity to absorb from the soil as much calcium as they require.

Let us get back to the discussion of the bad feature of too much limestone—that business about adding too much alkalinity to soil. When limestone comes in contact with the water in the soil the calcium portion of the limestone unites with that water to form what is commonly known as "limewater". Limewater is chemically known as calcium hydroxide with the formula $Ca(OH)_2$. The carbonate portion forms carbonic acid with the formula H_2CO_3, but this is not so active in the water, and allows the $(OH)_2$ of the limewater to dominate the activities. Water, in contact with soil, has the formula H(OH), and thus we begin to notice a similarity between (OH) in the soil water and the OH) in the limewater. We have learned that acidity and alkalinity exist at the same time. If we have more acidity than we have alkalinity, we say that our soil is on the acid side. If we have more alkalinity than we have acidity, we can say that our soil is on the alkaline side.

That pH Scale

Soil water, with its formula of H(OH), is nicely balanced with one positively-charged H and one negatively-charged (OH). But when we begin to put limestone on the soil, the calcium portion of the limestone begins to associate itself with more and more of the (OH) portion of the soil water. The carbonate part is not so active; thus our soil becomes more and more alkaline. This is another way of saying that our soil becomes less and less acid. But where is the dividing line? Where is that point at which the soil stops being acid, and becomes alkaline, and vice-versa? In order to answer this question a scale was designed.

This scale begins at the figure 7.00 and runs in two directions. From 7.00 down to zero the soil becomes more and more acid: from 7.00 up to 14.00 the soil becomes more and more alkaline. The figure 7.00 indicates a neutral soil, which means that the soil contains exactly the same number of the alkaline OH units as it contains acid H units. The scale is called the pH scale.

Limestone does something else when, as a calcium carbonate it is added to soil. It forms some carbonic acid (soda water) as was pointed out above, but carbonic acid is a very unstable acid. It falls apart in a few minutes to lose part to the atmosphere, and this is why your glass of soda pop tastes flat if you let it get warm or if you spend more than five minutes drinking it. Thus we believe that attention should be focused upon the dangers of too much of the alkaline qualities of limestone, and action should be taken immediately to guard against bringing on too much alkalinity, for acidity in soil is vital and as necessary as a carburetor is necessary to an automobile engine.

All acids contain hydrogen; the "business end" of any acid is hydrogen. The chemical symbol for hydrogen is H, and the H in the formula of water, H(OH), is hydrogen. This is the element that is most active in taking the place of other elements to push them out into action. It

(Continued on page 114)

ACCURATE SOIL TESTING, plus a knowledge of the exact pH requirements of each crop, is the key to the application of lime. Some acidity must be present.

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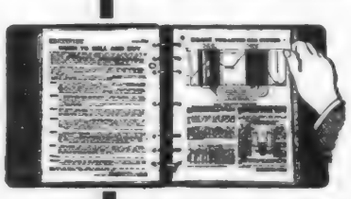

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SPANISH MOSS

(Continued from page 40)

land on which great cypress, tupelo and oak trees were growing, these uninformed lumbermen got the idea that they had also acquired title to the moss. Legal representatives of the company read law books and cited authorities which were overwhelmingly in their favor; injunctions and restraining orders were granted by the learned judge of the region, criminal proceedings were considered and warnings were posted; but the moss-pickers had no intention of abiding by the laws in books. They had their own unwritten law—the moss was for anyone with the means to pick it—it had always been that way, and always would be, regardless of judges and lawyers.

But the law was persistent and the pickers were forced to offer a compromise, very plainly in their favor. They offered to give the sawmill company a minute portion of the profits and would also agree not to crowd too closely upon the heels of the timber-cutters—a mistake Adonis Latiolais had made when the top of a falling tree pounded him into the swampy ooze, almost burying him alive.

The sawmill company could have cited sustaining laws as far back as the Institutes of Justinian, but they were advised by their clever lawyers that a century-old custom was against them. They accepted the terms of the compromise.

After the sawmills had slaughtered the forests and moved on, there were no more fat pickings for the moss-pickers. They were forced to return to old methods of paddling their pirogues and bateaux along the bayous and pulling moss out of the trees with long poles, to each of which a hook was attached.

For many years the Louisiana Department of Conservation has kept records of the annual commercial moss crop, the highest being in 1925 when 8,120 tons were ginned and sold for a total of $2.273,600. The 1926 figures show a yield of 8,400 tons which brought $1.974,000. However, these figures of production and price are above the average for the past ten years.

Although dark-eyed Acadians seem to be component parts of the romantic bayou country, they are not the only people who engage in moss-picking. White and negro farmers, after their crops are gathered in late autumn, go into the swamps to piece out their earnings. As welcome as the extra dollars are, farmers cannot keep in constant touch with the swamps as do the trappers and commercial fishermen who learn the location of the best moss crops and are quite likely to get there first when weather conditions are ideal for picking.

Even so, farmer Olivian Courville and his family of four, who live on Bayou Plaquemine, near the village of Plaquemine, gathered over 100.000 pounds of green moss in one season. Many other farm families have done almost as well, but their harvest is not equal to that of men who work as a

team, such as the Coussou-Louviere-Lejeune combination, three seasoned operators who go into remote areas beyond Murphy's Lake after "Black John", a special, high-priced type of moss which hangs only on tall cypress trees.

Spanish moss grows in all of the Southern states that border the Atlantic Ocean and the Gulf of Mexico, with Louisiana and Florida producing more than all the others combined. In the Bayou state the industry is largly confined to the Atchafalaya River Basin. In a single season, between the dates of January 1 and October 1 of 1949, the Schwing Moss Company of Plaquemine bought 3,574,460 pounds and during this same period the Louisiana Moss Products Company of Patterson bought 3,126,178 pounds, paying the pickers three and a half cents a pound at the gins. The Atchafalaya River Basin is about 100 miles long, varying in width from three to 25 miles, sufficient area to warrant the operation of 30 gins along its margins.

When Brenda and Linda Coussou crawl into their pirogues to follow their father up Bayou Sorrel they wear overalls and metallic helmets. These twins learned long ago that Norman caps are poor protection for their heads and necks against falling limbs; nor can kirtles of homespun be tucked into the tops of rubber boots. Their working clothes are identical with those of their parents. Ed and Eva, and not unlike those of brother Prescott and their sister Leola.

Except when high water drove him out, Ed Coussou has lived for 25 years on the bank of Bayou Sorrel, not far from its juncture with Bayou Plaquemine and near the very heart of the Atchafalaya River Basin.

Near the Coussou kitchen door is what appears to be a giant ant hill. It is an oven of *bousillée,* in which French bread is baked. The chimney of the Coussou home is also made of *bousillée,* which Mrs. Coussou explains, is simply moss and mud.

When the exiled Acadians began coming to Louisiana about 1760 they soon learned that many articles of service could be made from the strange air plant which hung in long festoons and cast weird shadows upon the lazy water of the bayous. They made ropes, bridles, saddle blankets and horse collars; they fashioned braids and decorated caps and bonnets; they stuffed pillows and mattresses with the clean, odorless fiber and found it excellent. Stones were not to be found in this coastal region and clays were not good for brick-making, so they made their chimneys out of *bousillée,* a combination of mud and the wild fiber which hung from trees in their yards.

These Acadians were more thrifty than their kinsmen who had come from Canada and directly from France a half century earlier, and far more realistic than the

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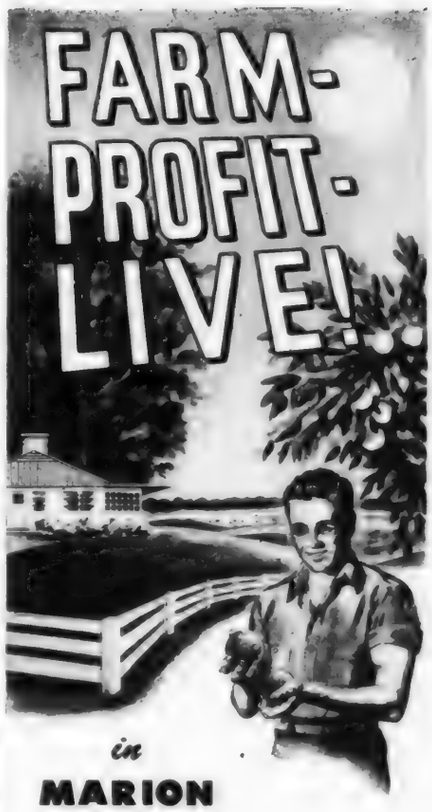

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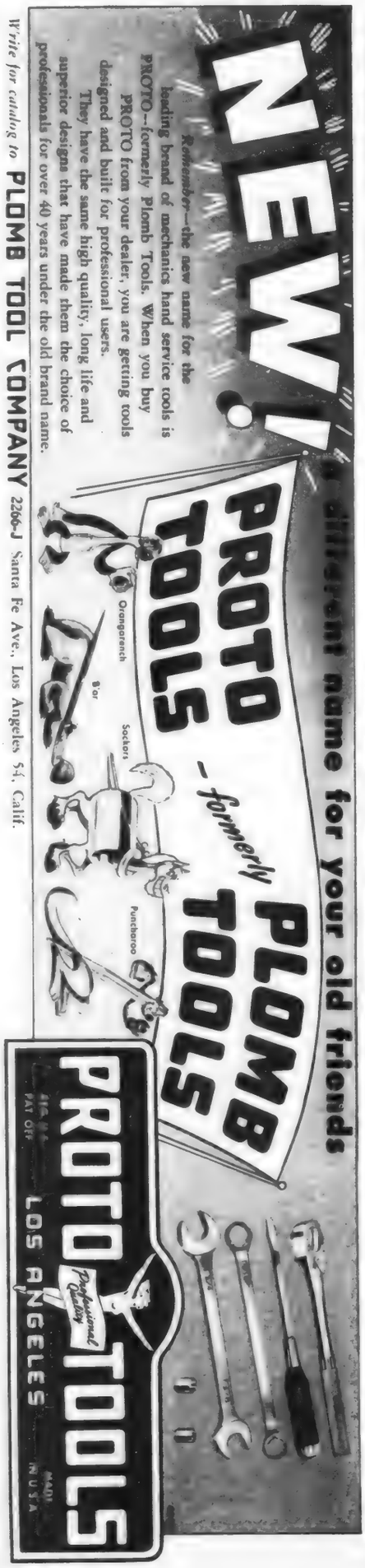
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Spaniards who had made a feeble attempt to claim possession of the country. Those earlier colonists failed to preserve the beautiful descriptive name the Choctaw Indians had for this useful air plant. In Choctaw "Ita-okla" means tree hair, but the Frenchmen began calling it "Barba Espagnol", Spanish beard, for no other purpose than to make fun of the Spanish dons who were so proud of their long whiskers. In retaliation the Spaniards told the Indians that the Louisiana trees had stolen wigs from the Frenchmen and as a consequence the air plant should be called "Cabello Frances", to identify it with French hair.

So the moss was called "Barba Espagnol" or "Cabello Frances", depending on who was doing the calling. Today it is called Spanish Moss, which is no more accurate a name than French hair. The plant doesn't grow in Spain and Spanish colonists made nothing of it when they found it growing in such abundance in Louisiana and Florida. Furthermore, "Ita-okla" is a kinsman of the pineapple and not remotely related to moss of any species.

Ed Coussou and his son-in-law, Slim Louviere, are not interested in the jibes that early Spanish and French settlers tossed on each other, nor are they concerned with botanical and historical names. "Black John" is the only name that excites them, and "Black John" is hard to find, which is no joke at all. It is the darkest, longest, biggest and heaviest moss to be found in Atchafalaya River Basin, or anywhere else. It grows only on old cypress trees, dead ones and live ones, and sizable cypress trees are scarce in the Louisiana swamps today. The insatiable lumbermen overlooked very few.

And that is why Ed Coussou, Slim Louviere and Long Lejeune work together. They pool their resources, coordinate their observations and protect each other from the hazards of their occupation. Working as a team, they have no dread of the remote areas where "Black John" hangs like a shroud over the forms of giant ghosts. These Cajuns love the pungent air of the swamps; they have no fear of alligators or the cotton-mouth, which they can smell, but water hyacinths send them into a rage.

When the lumbermen were logging out the swamps they cut "roads" to float the logs to the mills. Since then the water hyacinth has come in, slowly choking up the roads, suffocating the fish, and generally making travel slow and laborious. The moss pickers call down anathema on the plant which is less effective than 2,4-D and other chemical preparations now used to control it.

The three boats operated by the partners constitute the most fantastic flotilla that ever crawled through the Atchafalaya River Basin.

After serving Ed Coussou for 25 years, after out-living three hulls, his in-board one-and-a-half horsepower motor is now being called upon to perform heavier duty. The derrick which mounts the bateau not only adds weight to the load, but the aged motor also operates a device that chews water hyacinths into pulp and pushes it aside. Slim Louviere also uses a one-and-a-half horsepower in-board motor to operate his derrick-mounted barge.

One glance at Long Lejeune's craft—even while he is explaining why he uses an out-board motor—is sufficient to cause anyone to marvel at its design and architecture. It reminds one of a fire escape or a cattle chute mounted on a flat bottom boat. It is functional, perfectly designed for its purpose, which is getting moss out of high trees and conveying it out of the swamps. *"Mon ami,"* Ed Coussou says proudly, "you are looking at a moss boat."

The derrick or platform on the bateau enables the pickers to reach higher into the trees to strip them of their burden. For this operation the men use a long haft with a metallic hook in the end. The work is hard and somewhat hazardous. In addition to the red ants and black spiders which inhabit the moss, there is constant likelihood of dislodging dead limbs and causing them to crash down upon the heads and shoulders of the pickers. That is why they wear metallic helmets.

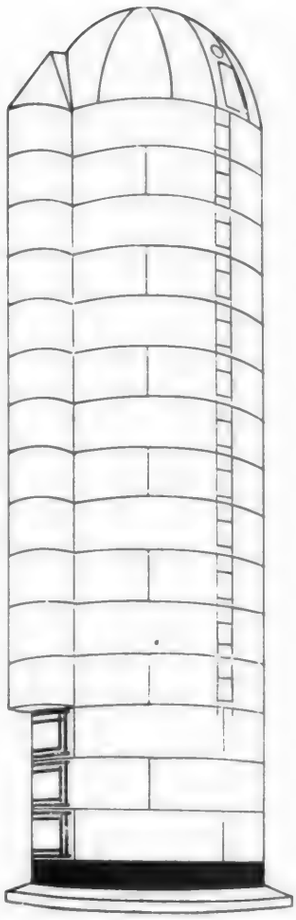
The moss gathered from the trees must be cured or retted. It is piled in long rows about four feet wide to about shoulder height of an average man. Here it is wetted thoroughly and left to go through a heating. Two months later the row of moss is turned up-side-down, again wetted and left to heat. The action of heat and moisture causes the pulpy cortex to sluff away from the strong, black fiber, which resembles the hair of a horse's tail.

The black fiber is then scattered out to dry. The roof of a building, fences, tops of levees, or anything that will suspend it in the air and expose it to the sun are used.

After drying, the moss is ready for ginning, which operation disentangles the fiber and relieves it of foreign matter such as bark, twigs, and leaves. After ginning, it is pressed into uniform 300 pound bales.

When the picking is good one man can gather 1,000 pounds of green moss in an eight hour day. This cures and gins out to about 400 pounds. At 12 cents a pound for ginned moss, the average day's wages amount to $48.00. Although moss can be picked the year around, conditions are best in the fall and winter, and the gins are in full operation only in winter. Picking the moss is only one of the operations before the cash is in hand. Transporting it from the swamps and spreading and curing it takes more time.

The moss-picker sells to the ginner who in turn sells to the manufacturer of upholstery. The fiber is used in many articles



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Although the felling of the big trees that originally grew in the swamps diminished the tremendous quantity of Spanish moss, there seems to be no danger that demand will exceed production. Strip an oak, pecan, tupelo or cypress of its ghost-like shroud, and in three years it will be completely robed again, with no serious injury to the tree. The tree is not a host to the moss in the sense that it is preyed upon by a parasite. The tree keeps the moss suspended; its food and moisture it gathers from the air. This air plant gets no nourishment whatsoever from the tree, giving botanists opportunity to make steadfast claim that Spanish moss does not injure the living object to which it is suspended. But some of the Louisiana tree-doctors disagree. One park supervisor has accounts to show that over two tons of moss were taken from a large live oak, a task that was necessary because the moss was choking the tree to death, rendering it incapable of growing leaves.

THE AUTHOR– Sam Mims was born on a Louisiana farm and grew up among the people of the bayous. Lawyer, soldier and government research specialist, he has written a number of books on his native state. His "Chenault of the Flying Tigers" was a best seller. He now lives in Atlanta and is a contributor to many national publications.

THE LITTLE FOXES

(Continued from page 63)

casses can be found. More often there are only bits of hair, bone, or feathers littering the den area, and these are clues as to which animal the fox killed. Other indigestible materials such as bones and beaks are identified by breaking apart the droppings.

Field mice are the primary food of both the red and gray fox. A red fox will capture as many as seven or eight mice in a single hunting foray and hide them beneath leaves or grass to pick up for later use. Gray foxes eat almost as many mice, but they eat them on the scene rather than hide them. Both species eat large numbers of grasshoppers and crickets, especially in autumn when the cool days make the insects sluggish. Song birds are a delicacy.

During the summer months both species eat a variety of nuts and berries, and occasionally eat grass and wheat. During the winter they are almost strictly meat eaters, but a red fox will dig through the snow in an orchard to get a frozen apple.

Foxes will often drag carrion to their dens. Wildlife authorities say this habit is largely responsible for the belief that foxes will kill sheep and pigs. Actually foxes seldom attack anything larger than barnyard poultry.

Obviously, foxes may be either friends or foes. It depends on how numerous they are and what safeguards the farmer uses to protect his poultry.

Any adult fox can wreak havoc in a chicken yard. In one reported case, two foxes slaughtered 160 chickens in three days.

Some foxes are not criminals. Farmers tell about foxes which have reared litters of pups within sight of their barnyards year after year without molesting the chickens. If all foxes were constant chicken eaters there probably would have been few chickens left in Butler County before Bill Geisler started hunting.

Farmers living in fox territory can expect heavy losses unless they take the precaution of penning up their chickens at night. They can discourage fox raids by keeping a good farm dog around. Brushy cover should be cleaned away from the chicken yard fence, and the approaches, especially during the spring and summer months when the yard is populated by young tender birds, and the fox has a family to support.

Foxes normally go on chicken killing sprees only in the spring. Their diet of rodents and insects actually makes them a friend of man during most of the year. Rabbit killing may not endear foxes to the hearts of sportsmen. However, it is a real help to most farmers and particularly to vegetable growers and orchardists, who may suffer more damage from the rabbits than the foxes.

About two counties south of Geisler's farm is the fox hunting territory of Father

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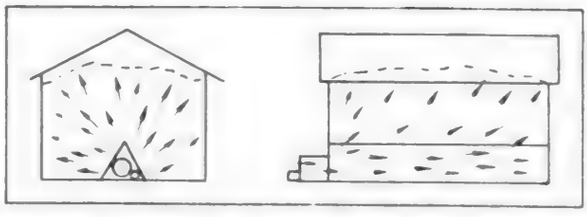

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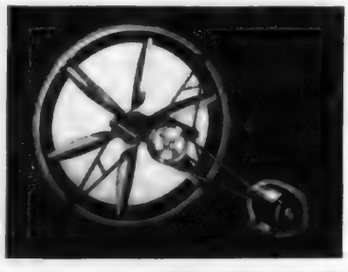

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Francis B. Heider. In contrast to Geisler, Father Heider is of the orthodox fox hunting school which calls for the use of long-eared, baying fox hounds. He keeps four fox hounds anchored in the locust grove behind his parish house in Withamsville, Ohio.

Father Heider has been a fox hunter for 25 years, and disagreeing somewhat with Bill Geisler, he still thinks a fox is foxy. It's a matter of outsmarting and outwaiting them. "I've shot more male than female foxes," Father Heider says. "The females seem to be smarter at protecting themselves. They all have a strong sense of self preservation," he adds, "and they're good at dodging and dashing through heavy cover to keep away from dogs."

During the winter of 1948-49 he shot 19 foxes, and claims that his take was below average. During the previous winter he took 24 foxes. He has the hides tanned and made into double scarves and jackets, which he sells for the benefit of his church. The low price of fox fur, however, has discouraged him in this enterprise. Next winter he figures he will just hunt for the recreation and not worry with having the pelts made up. "It costs a lot to get the furs made up," he says. "Why these two double scarves I just got back, cost me 80 bucks.

"If a person could just be patient," he adds, "he'd get more foxes." Father Heider figures out where the foxes will run most often, and is there waiting for them when the dogs bring them around. He has learned that there is usually some favored spot in their itinerary where they will cross every time they come close to it. Sometimes it's a gulley up which they run, sometimes it's a ridge. "You can find these locations in winter by looking for concentrations of tracks," Father Heider points out. "Or if you listen to the dogs for a while you'll begin to figure out where you are hearing them most often. The fox travels in a circle, so once you find the location all you have to do is wait. You don't even have to hide. With a dog on his tail the fox will come right at you."

Father Heider, like Geisler, has found little trouble locating farms where he can get permission to hunt.

Other Ways of Hunting

Fox-harrassed communities which have no one like Bill Geisler or Father Heider to keep the fox population whittled down sometimes organize drives. Hundreds of people cooperate; shouting, and beating the bushes, they move in straight lines from four directions toward a single field. Foxes are kept moving ahead and are finally trapped in a tightly knit human ring. But fox drives usually yield only reds. Gray foxes, probably the more criminal of the two, hole-up at the first sign of danger.

Foxes may be hunted, too, with no intention of killing them. This type of romanticized hunting involves an all-night fire on a hillside and a chorus of compet-

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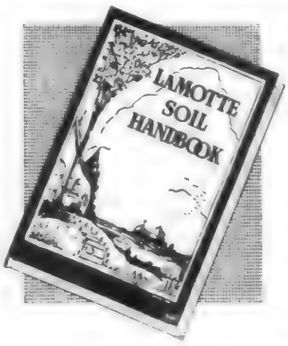

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ing hounds. The hunter derives his pleasure from watching his dogs running on a hot trail with their heads held high, or from the melodious sound of a baying dog as it breaks from a confused pack to lead on a freshly found trail. When the hunter has his fill, he sounds his fox horn to call in the dogs, and the fox runs free.

Hunters such as these dread the presence of a fox killer like Geisler, who makes inroads on their favorite wild animal. They make him promise not to kill foxes near their farms. But to assure themselves of a fox to run they dig out a den of young foxes in the spring of the year and bob their tails. A gun-hunter like Geisler is usually so startled at the sight of a bob-tailed fox that the fox makes its get-away before the hunter recovers his composure.

Fox Cunning

Foxes are the most talked-about of farm predators, but Geisler questions their reputed cunning. He believes it is mostly myth, and it probably is. Yet he passes along his share of stories about foxes.

There was a farmer who said a big red fox took delight in tormenting him. He was an old man crippled with rheumatism. His chicken yard was pushed up against a bushy hillside and surrounded with a split-rail fence. The fox concealed himself in an elbow of the rail fence and waited for the old man to come out to gather the eggs.

As the farmer hobbled through the chicken yard, the fox would leap the fence and grab a hen almost from under the farmer's feet. Dodging the old man's flailing cane, the fox would lope leisurely off with its prey. Finally, the old man called Geisler and the fox fell victim to his 12 gauge.

The fox question is still unsettled. Although wildlife experts are still investigating the food habits, their evidence so far indicates that foxes are generally more beneficial than harmful.

In spite of the constant war of extermination carried on against foxes, the fox population keeps ahead of the hunters. Occasionally they become abundant and individuals among them live off meat taken from the chicken yard.

It takes only one errant fox to sour a farmer on the whole clan, but foxes, like horses, should be judged as individuals.

THE AUTHOR George S. Fichter is a promising young writer on wildlife and rural subjects. A graduate of North Carolina State, he teaches zoology at Miami (Ohio) University and contributes to sports and scientific magazines.

HANDLE WITH CARE

(Continued from page 61)

wasn't a pig that wasn't bruised."

Having a good chute is a great help, but there are still problems in getting an animal to walk up into the truck. When tempers flare up there are too many damaging implements handy to use on a recalcitrant animal. Tie rods from the truck, pitchforks, chains, whips and clubs have all been used to move the animal and lower the price of his carcass. The Live Stock Loss Prevention Board recommends the use of a canvas slapper, a reed handle with a double layer of heavy canvas attached, that produces a stinging slap to the stubborn beast. The slapper stings a little, makes a loud noise, usually moves the animal, and doesn't damage the meat. Humane societies also put their mark of approval on this tool and recommend that the livestock men keep them at hand so that when they are tempted to reach for a club they get a slapper instead.

Humane society people are divided in their opinion of the electric prod, but will usually sanction its use if the voltage is kept low. Professional livestock handlers are much more enthusiastic about its use. They point out that the electric prod will keep the animals moving along. As long as the current is kept low it won't cause cattle to lunge and injure themselves by collision. Without it, the handlers usually use something more lethal, sure to do costly damage. Dr. John F. Gest, a U. S. Department of Agriculture veterinarian, speaking of the electric prod says, "Where the electric current is kept at a reasonable voltage the prod doesn't burn or injure the animal. I ought to know for I've been poked with one. Far from believing that it was inhuman, the man that prodded me thought it was rather humorous. It shocked me for a moment and I moved out of range, but I wasn't really hurt. Here at the Cincinnati Stock Yards the Society for the Prevention of Cruelty to Animals won't let the prod be used. So we get a lot worse damage done by the use of clubs when no one is looking."

Inspect The Truck

The truck itself and the way it is driven can cause a lot of damage and the farmer should take care to select a careful driver who has good equipment. Nails or bolts that project into the truck will cause damage; slippery floors without sand bedding will cause spreaders, cause animals to fall, and lets them slide into each other and the sides of the truck on turns and stops. Broken floor boards and broken legs go together and once an animal is down from an injury it is easy for it to be killed by trampling.

A truck cannot do a safe hauling job if it is overloaded. Animals that go down are straddled and trampled and cannot fight their way back up into the limited space left for them. Maximum load recommendations are shown on the chart on page 96. On the other hand too few animals in a truck get no support from each other and will slide the length of the vehicle on stops and turns. A partial load should be partitioned off into a smaller space.

Farmers that are shipping one or two animals to market would do well to get a regular trucker to pick them up when he has a short load.

Partitions should also be used when different classes of animals are shipped in the same truck. Calves or hogs should be separated by stout partitions from cattle or they will be trampled. Animals that will inflict damage on the rest of the load, like bulls, boars or stags, should also be tied and partitioned. If a weakling that might not stand the bumping of the rest of the animals is being loaded it, too, should be partitioned off to protect it. Partitions should be stout and easily adjusted.

If a truck driver wants to establish and maintain a reputation with farmers as a reliable trucker and if he wants to keep in good standing with the insurance companies, he has to know the safest way to load his truck and he must drive with care and consideration for the animals. The farmer's job is to find such a man.

A meat packer who is constantly haunted by the problem of bruised meat

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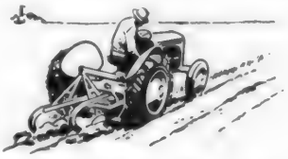
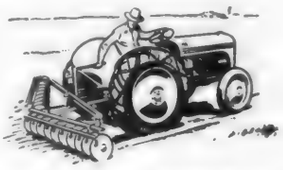
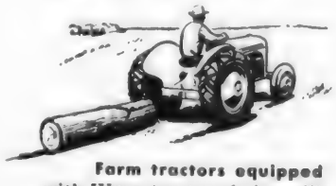


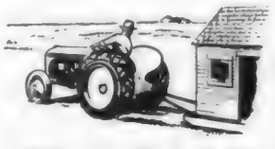
No costly waiting after rain to plow, cultivate or harvest. Save hours, even days, with WEED tractor chains.



Weed tractor chains keep your rubber tired tractors rolling when ground is too wet to work without them.



Farm tractors equipped with WEED tractor chains will not spin or side-slip in mud or gumbo.

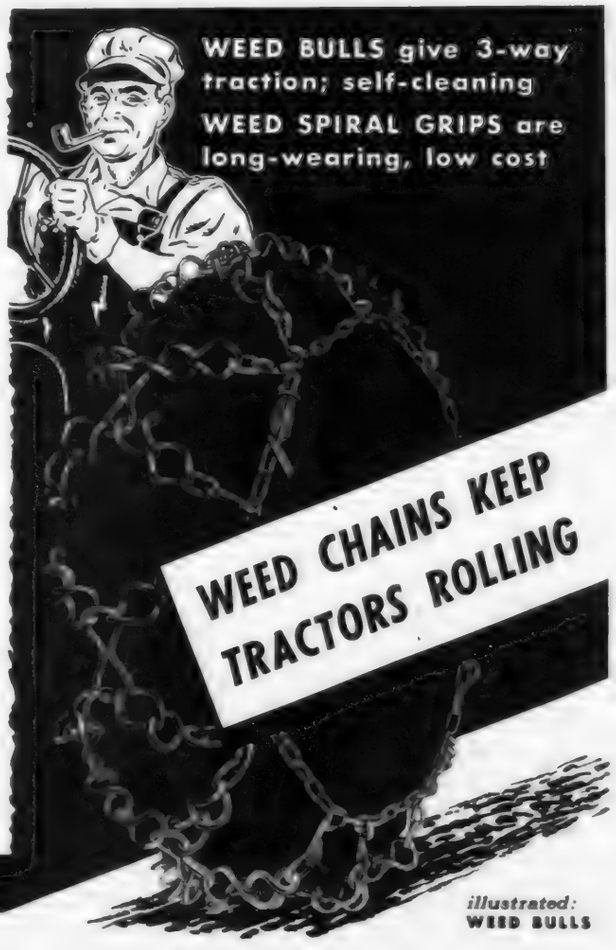


Right and left hand twist retards tightening up; no adjusting; easy to put on and take off—a one man job.

See or call your implement dealer and order your WEED TRACTOR CHAINS now

ACCO York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE


WEED BULLS give 3-way traction; self-cleaning
WEED SPIRAL GRIPS are long-wearing, low cost
WEED CHAINS KEEP TRACTORS ROLLING

illustrated: WEED BULLS

Feed TUXEDO PIG MEAL...

for Stronger Pigs Faster Growth

When you feed the sow Tuxedo Pig Meal both before and after farrowing, she tends to produce stronger litters and give more milk, and the pigs get off to a winning start.

When the pigs are three weeks old, start feeding them Tuxedo Pig Meal in addition to the sow's milk, to supply the extra vitamins, proteins and minerals the pigs need for fast, sturdy growth and to avoid weaning time setbacks.

Ask your Tuxedo Dealer for Tuxedo Pig Meal. Ask him also about the other high quality Tuxedo hog feeds — Tuxedo Big 40, Tuxedo Porkmaker, Tuxedo Hog Ration. It pays to feed Tuxedo from start to finish.

THE FEEDERS' SILENT PARTNER

THE EARLY & DANIEL CO.

CINCINNATI 2, OHIO Established 1881

TUXEDO HOG FEEDS

BUY WITH CONFIDENCE—FEED WITH PRIDE

says, "Look at those black skid marks on the street near the stop light. I can't look at them without mentally estimating the amount of damaged meat such a sudden stop makes. I saw a truck stop there the other day with three steers loose in back. They skidded the full length of the truck and crashed against the front end. That one stop cost somebody plenty of money. If they'd been partitioned into a small space in the front, even the bad driving wouldn't have injured them so much."

Travel By Rail

Since the days when Abilene, Kansas, was a roaring stock town that marked the end of overland trailing and the beginning of railroad shipping, the railroads have constantly increased and improved their stock handling facilities. The truckers have cut in on their domain as far as short hauls are concerned, but the railroads still handle the great bulk of the long distance traffic.

The biggest part of the stock that is shipped by rail are ordinary animals on their way to the packers or to the feed lots, but the railroads provide for the shipment of expensive breeding stock and aristocratic show animals. They even carry private cars for race horses that are in the upper income brackets. The more expensive animals will be charged a higher fare than their common brothers.

The railroads have what is called a Uniform Live Stock Contract which provides for the shipping of "ordinary livestock" and "other than ordinary livestock". The "other than ordinary" must be listed and described and a declared value stated for them. The ordinary livestock are valued at current market rates. In the fine print on the back of the contract the railroads outline the terms and conditions of the agreement. It is well to sit down with a reading glass and an interpreter and study this. Boiled down to a very general statement it says that the shipper is responsible for his own livestock from loading to delivery and that the railroad can be held responsible only when it is shown that they have been negligent.

When shipping by rail, the shipper signs a contract and arranges with the local freight agent for the type car he needs for shipping his animals. The railroads will do their best to supply him with a car in good repair, but it is well worth his while to inspect it to see that there are no nails or bolts in a position to claw at his stock; that the floor is in good condition; that the walls are prepared for the kind of weather the stock must endure—plenty of ventilation in the summer, papered over in the winter to protect them from freezing. It is the shipper's responsibility to put bedding on the floor. The railroad will supply bedding if the shipper desires it and charge him for it. A layer of sharp sand will do wonders in preventing slipping and should always be used. In the winter time the sand can well be topped with a good layer of straw for greater warmth.

Animals should be delivered to the railroad yards early and given a chance to cool off before loading. An hour's rest in the loading pens will give them a chance to settle down before they go into the car. Checking with the freight agent will prevent loading too far in advance and having them wait in a crowded car until the railroad is ready to couple on and start them on their journey.

SAFE LOADING GUIDE

TRUCK SHIPMENTS

CATTLE

Average weight per head:	700	800	900	1000	1100
Number of animals in 13 foot truck:	11	10	9	8	7
Number of animals in 16 foot truck:	14	13	12	11	10
Number of animals in 20 foot truck:	18	16	15	13	12
Number of animals in 24 foot truck:	22	20	18	16	15

HOGS

Average weight per head:	100	150	200	250	300
Number of animals in 13 foot truck:	43	33	26	23	20
Number of animals in 16 foot truck:	58	44	35	30	26
Number of animals in 20 foot truck:	70	54	42	36	32
Number of animals in 24 foot truck:	86	65	52	45	39

SHEEP

Average weight per head:	50	75	100	125	150
Number of animals in 13 foot truck:	50	40	34	30	27
Number of animals in 16 foot truck:	65	54	45	42	38
Number of animals in 20 foot truck:	84	67	56	50	45
Number of animals in 24 foot truck:	100	80	70	64	55

Shipping Laws

As soon as the livestock is loaded the time is noted on the waybill and the 28 hour law begins to operate. This law provides that all animals shipped by rail shall be taken off the cars every 28 hours and given feed and water and a rest of at least five hours. The shipper may, if he wants, lengthen the periods between rests by signing a waiver to that effect. Even with a waiver the animals must be fed and rested at the end of 36 hours. The feed that is given the animals is charged to the shipper and he may, if he wishes, specify the kind and amount of feed that is given provided it is as much as the minimum set forth by

So much FOR SO LITTLE

Concerned over the cost of feeding? Remember that the only way to measure the cost of your cattle rations is not in the cost per pound of feed—but in terms of the cost per pound of quality beef produced by the feed.

That's where B-F SuperSol comes in. Millbrook cattle "achieved this gain on an average daily allotment of 1¼ lbs. of B-F SuperSol per head compared to the 2 lbs. allotment we normally use when feeding other protein supplements."

MILLBROOK FARM
PEORIA, OHIO
BREEDERS OF ANGUS CATTLE,
POLAND CHINA HOGS, SHROPSHIRE SHEEP

W. E. HALL
PHONE 2271

MARYSVILLE, OHIO

W. J. RENNER
PHONE 16-558

June 15, 1949

Mr. Evarts Speed, Jr.
Manager, Grain Department
Brown-Forman Distillers Corporation
Louisville, Kentucky

Dear Mr. Speed:

Thanks for the promptness in handling our recent rush order for more B-F SuperSol. No other supplement seems to take its place in promoting and maintaining appetite in our steers.

We recently shipped our first load of Springwood-Glencarnock steers to Chicago and were highly pleased on the excellent finish and high rate of gain obtained by supplementing our grain ration with B-F SuperSol. This group was put on feed Nov. 10, 1948, weighing 600 lbs., and was sold May 30, 1949, weighing 1037 lbs., at Chicago. A gain of 2.3 lbs. per day per animal. This group achieved this gain on an average daily allotment of 1¼ lbs. of B-F SuperSol per head compared to the 2 lbs. allotment we normally use when feeding other protein supplements. We received $28.25 per cwt. for them.

We still have 36 head of Angus steers on full feed and it is remarkable how the B-F SuperSol maintains their appetite even during this hot humid weather that we are having.

Thanks again for your prompt service and we will try and advise you earlier relative to the next shipment.

worth repeating

Sincerely yours,

Hall & Renner

W. E. Hall

W. J. Renner

WEH,WJR:at.

Our
FREE BOOKLET
will tell you what
SUPERSOL
will do for your livestock — at a cost of only 2½c per head per day!

Write

FEED DIVISION
BROWN-FORMAN
DISTILLERS CORPORATION
at
LOUISVILLE IN KENTUCKY

(Available in pellet or granular form.)

PROVIDES

true VITAMIN A
VITAMIN D
B-GROUP VITAMINS
RIBOFLAVIN, THIAMIN
NIACIN, CHOLINE, PYRIDOXINE, PANTOTHENIC ACID,
p-AMINOBENZOIC ACID
BIOTIN, FOLIC ACID
FATS and PROTEINS
CALCIUM, PHOSPHOROUS
and ESSENTIAL TRACE MINERALS

plus **VITAL PRODUCTIVE FACTORS**

Which is really Ida Lupino?

Batteries also look alike, but

AUTO-LITE

Sta-ful

needs water only 3 times a year

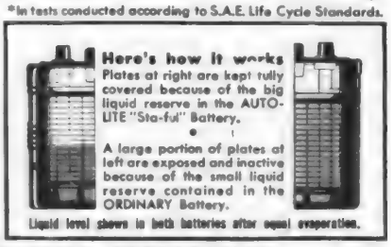
In normal car use

NO MATTER how much batteries look alike, you'll have the answer to your battery problems when you install Auto-Lite "Sta-ful," the battery that needs water only 3 times a year in normal car use. "Sta-ful" Batteries also give 70% longer average life* than batteries without Sta-ful features.

And you'll have the right answer when you select the photograph at the bottom as lovely Ida Lupino, producer of the Emerald Production "Not Wanted." At the top is Ariel Ames of New York City.

Don't be confused because batteries look alike. Be wise—switch to Auto-Lite "Sta-ful." Money cannot buy a better battery. See your neighborhood Auto-Lite Battery Dealer today.

*In tests conducted according to S.A.E. Life Cycle Standards.


Here's how it works
Plates at right are kept fully covered because of the big liquid reserve in the AUTO-LITE "Sta-ful" Battery.
A large portion of plates at left are exposed and inactive because of the small liquid reserve contained in the ORDINARY Battery.
Liquid level shown in both batteries after equal evaporation.

Toledo 1 **AUTO-LITE BATTERY CORPORATION** Ohio

TUNE IN "SUSPENSE!"... CBS RADIO NETWORK THURSDAYS... CBS TELEVISION TUESDAYS

the U. S. Department of Agriculture. It is unlikely that a shipper would request less feed since the specified minimum is a bare subsistence amount and is considered too little by most livestock men.

It is not necessary to have a handler ride with the stock to load and unload them for their legal rest periods. Experienced railroad employees will handle this work. The shipper may, if he wishes, send along a stock handler at no extra cost. Big hearted stock men have from the earliest days used this privilege to send neighbor kids, college students and others on a free trip. The hitch lies in that a clause (in fine type) on the back of the contract says that the railroad will not be responsible for the loading and unloading of the stock when a stockman accompanies the load, nor will they be responsible for the man himself if he is injured.

Each state has its own laws governing the testing and quarantine of stock that are shipped into it. As a rule these laws do not apply to animals that are being shipped to a packing house for immediate slaughter. Shippers who are sending livestock across state lines to be used as breeding stock or for long term feeding would do well to check the booklet, "State Health Regulations Governing the Admission of Livestock" issued by the U. S. Livestock Sanitary Association of Trenton, New Jersey, and B. A. I. Order 309 issued by the U. S. Department of Agriculture, Bureau of Animal Husbandry.

Hogs Are Poor Travelers

Hogs may have B. O. but they do not get it from sweating. As a matter of fact, hogs have only a few sweat glands and these are located on the lower part of their legs This condition makes it difficult for them to cool off. They also have a hard time getting rid of bodily wastes quickly. Like dogs they must get rid of a lot of moisture and waste through their breathing. And here man has complicated their problem. We have fattened them to the point where the ample lungs of the wild hog are compressed to about a quarter of their capacity by fat. The result is that over-heating or over-exertion will kill a hog in short order.

The railroads and some truckers give the hogs a break by wetting the sand bedding whenever the temperature goes above 70 degrees. The wet sand does a lot to keep the load cool. Another device is to tie sacks of ice in the cars to keep down the temperature and, as it melts, keep the sand wet.

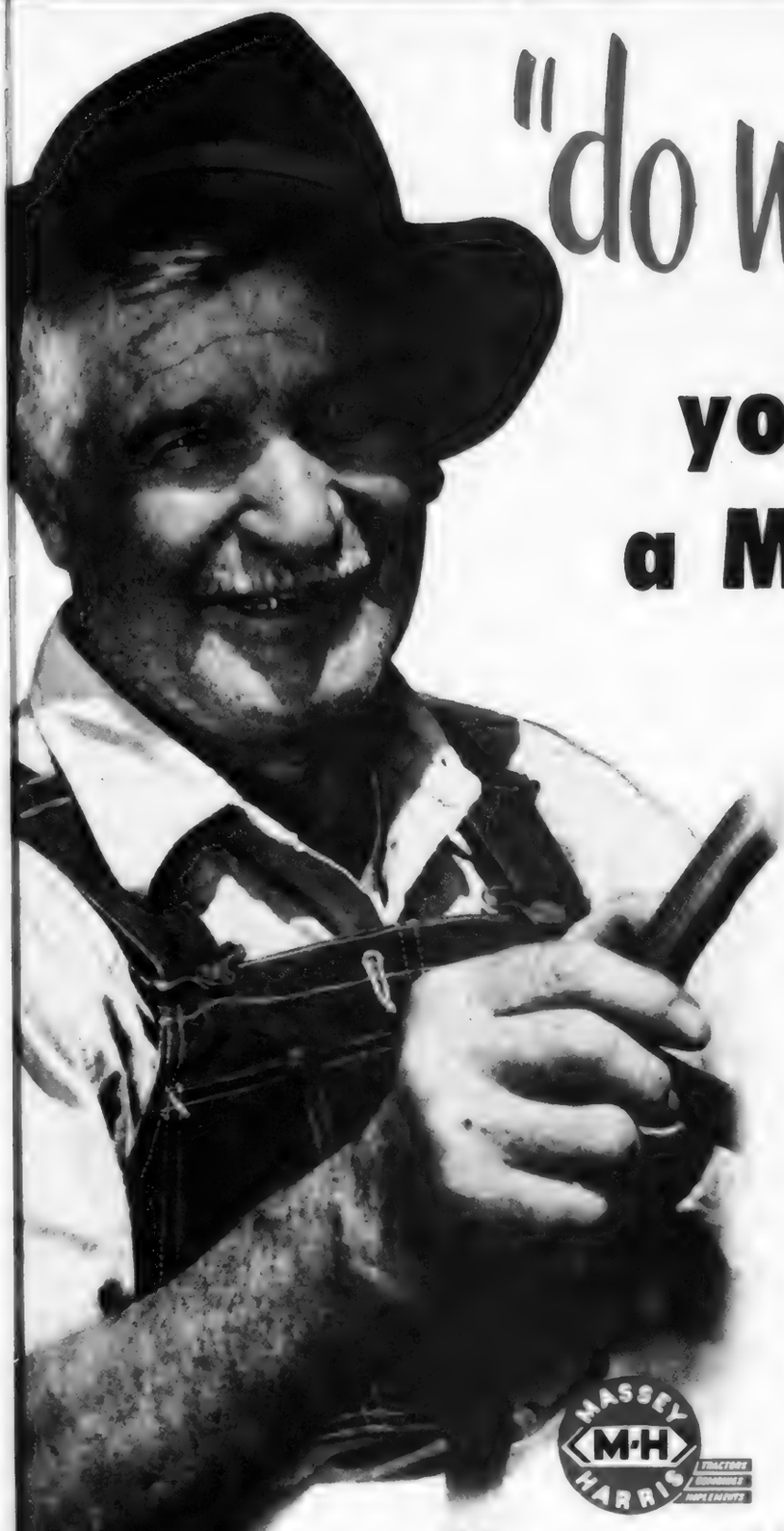
Getting the proper air circulation through a load of stock is a tricky business. In the winter, cold blasts will cause the hogs to pile up for warmth and some of them will smother. On the other hand, too little air circulating through the load can be equally disastrous. Farmers have found that hauling hogs in a tight-walled grain bed truck can be almost as fatal for the hogs as shooting them, even though the top is open. Getting sufficient air through the bottom deck of double deck trucks is another serious problem.

A holding pen with a loading chute and quiet handling, will minimize the risk of causing hogs to overheat. If the hogs are driven to the pen and allowed to rest for a while before the truck arrives they can be loaded more quickly and with less effort. Pigs that have been run all over the farm yard getting them into a trucker's make-shift chute have two strikes on them before they start their trip to the market.

The Big Fill

All sorts of devices have been tried by wily farmers to throw a little extra weight into their animals before they get on the scales. An extra heavy feed is sometimes given animals about to embark on a short trip. Stock traveling further has been given a constipating feed with extra salt to make them thirsty in the hope they will take on a big load of water when they arrive. Most observers feel that farmers gain little and risk much by such tricks.

Livestock buyers, they point out, see thousands of animals every day and grow very shrewd at gauging the amount of fill they have taken on at the yards. They trim their offers accordingly. Animals, particularly hogs, travel better with only a moderate sized meal under their belts. Over-feeding hogs before a trip causes them to heat up and this brings on losses. Even steers



"do what I did— you'll make it a Massey-Harris"

● There's only one way to know how good a Massey-Harris Tractor is — Get up on the seat and drive one.

Settle down into the "Velvet-Ride" Seat . . . feel its shock absorber comfort . . . play with the wheel a bit . . . look at the view you get of the work . . . the handiness of all controls . . . the way your feet almost set themselves automatically for the clutch, the individual rear wheel brakes, the power lift.

Then step on the electric starter. Instantly, there's the deep throated roar that means power.

Now take it out into the field. Get the feel of the feather-touch, castered-wheel steering that saves your arms and shoulders . . . the smooth, responsive power that takes you through every drawbar and belt job with ease.

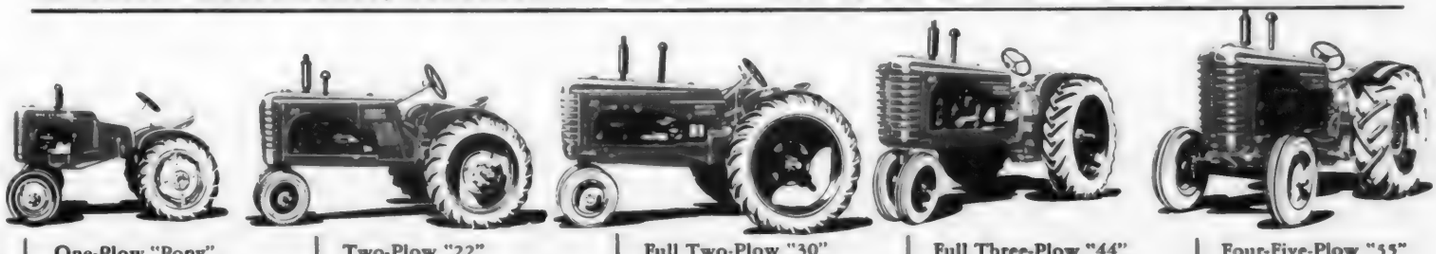
Yes! the Massey-Harris gives you an entirely new concept of tractor power. And at the end of the day, when you look into the fuel tank, you'll realize that it's economical power as well.

For here's a line of tractors — in five power sizes for every size and type of farm — designed, engineered, tested, and field proved to do a better job easier, at lower cost, for a longer time.

Your Massey-Harris Dealer will be glad to arrange a demonstration for you. Take advantage of this invitation. You'll learn what a modern tractor is like — you'll want a Massey-Harris on your farm. For a folder by mail, write to The Massey-Harris Company, Dept. J-222, Quality Avenue, Racine, Wisconsin.

Make it a Massey-Harris

5 BASIC MASSEY-HARRIS TRACTORS . . . A SIZE AND TYPE FOR EVERY FARM, CROP AND PURPOSE!



One-Plow "Pony" | Two-Plow "22" | Full Two-Plow "30" | Full Three-Plow "44" | Four-Five-Plow "55"

*AC's patented processes make Coralox the finest insulator in spark plug history. Improved electrical insulation, no matter how high the temperature. Better heat conduction. Maximum resistance to heat shock. Less fouling, harder, stronger, longer-lived.

GET READY for cold weather driving! Sharpen up the engine performance of your tractor, truck or car with the finest spark plugs ever made . . . AC's with patented *CORALOX** Insulator. Instant starting in coldest weather! Steady firing at any engine temperature! Get them from any implement dealer or service dealer who displays the poster with the above picture.

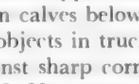
AC SERVICE BUY WHERE YOU SEE THIS SIGN

AC SPARK PLUG DIVISION • GENERAL MOTORS CORPORATION

can be killed by trying to digest too big a load of feed on the ride to town.

When the stock is delivered at the yards, the farmer and the driver he employs both lose control of the handling. Occasionally the animals are handled roughly and bruises are put on them that the farmer must pay for. The stock yard management and the packing companies, however, are carrying on a constant campaign to educate the yard handlers. Tours of the packing plants are arranged for the handlers to show them the bruised meat that results from their roughness. Perhaps an even greater deterrent is the presence of observers for the S.P.C.A. who have the authority to arrest and press charges against a man who lays on with a club.

The National Live Stock Loss Prevention Board has summarized all of the do's and don'ts of the livestock shipping business into 22 precautions: 1. Dehorn cattle, preferably when young. 2. Remove projecting nails, splinters and broken boards in feed racks and fences. 3. Keep old machinery, trash, and any obstacles that may bruise out of feed lots. 4. Do not feed grain heavily just prior to loading. 5. Use good loading chutes, not too steep. (Blueprints free from National Live Stock Loss Prevention Board, 700 Exchange Bldg., Union Stock Yards, Chicago 9, Ill., on request.) 6. Bed with sand, free from stones, to prevent slipping. 7. Cover sand with straw in cold weather, but no straw for hogs in hot weather. 8. Wet sand bedding in summer before loading hogs, and while enroute. Drench when necessary. 9. Partition packing sows from light weight butchers. 10. Provide covers for trucks to protect from sun in summer and cold in winter. 11. Always partition mixed loads to separate classes, and calves from cattle. 12. Have upper deck of truck high enough to prevent back bruises on calves below. 13. Remove protruding nails, bolts or any sharp objects in truck or car. 14. Load slowly to prevent crowding against sharp corners, and to avoid excitement. Do not overload. 15. Use canvas slappers instead of clubs or canes. 16. Tie all bulls in truck or car, and partition boars, stags, and cripples. 17. Bull board should be in position and secured before car door is closed on loaded cattle. 18. Drive carefully. Slow down on sharp turns and avoid sudden stops. 19. Inspect load en route to prevent trampling of downed animals. 20. Back truck slowly and squarely against unloading dock. 21. Unload slowly. Don't drop animals from upper to lower decks; use cleated inclines. 22. Never lift sheep by the wool.



POISON IN THE PASTURE

(Continued from page 51)

name, were discovered to cause the same sickness in the Southwest. Later Dr. James F. Couch, a chemist in the Department of Agriculture, who most recently has isolated the drug rutin from buckwheat in commercial quantities, extracted an oily alcohol from these plants which he named tremetol. With tremetol he was able to reproduce symptoms of this poisoning in animals and human beings. The means by which the poison was transmitted to milk was also determined. The alcohol has a ready affinity for fat in milk, contaminating not only whole milk but also the butter made from it. One way to help cure poisoned animals, therefore, is to milk them regularly to remove the poison. But *destroy the milk!*

Still another extraordinary poison which plagued settlers in the West is the so-called alkali poisoning reported in parts of South Dakota, Nebraska and Wyoming. An army surgeon named Madison, at Fort Randall in Nebraska Territory, in a report written in 1856 gives the first official description of symptoms of this "disease" which struck the animals of the post. Since then widespread reports of this type of poisoning, also called the "blind staggers," have been recorded.

It was not until the nineteen thirties that it was discovered that certain plants growing in soils containing selenium will absorb sufficient quantities to poison seriously all livestock grazing upon them. Much confusion arose from earlier studies to determine the cause of poisoning before the underlying rocks

NOTHING ELSE LIKE IT!

New CASE HYDRAULIC CONTROL

FOR "S," "D" AND "LA" SERIES TRACTORS

IT'S SIMPLE
IT'S SEALED
IT'S SURE
and it's FAST

One Little Lever Does It All

This one lever raises and lowers, angles and straightens gangs—fast or slow as you like. Implements are held at any point you desire, adjusted as often and as accurately as you like.

Full control of all tractor-mounted Case implements, also all trailing implements and machines with ASAE standard mounting for portable cylinder.

Single unit contains pump, control valve, filter, etc.—all sealed in compact housing.

Low pressure operation is easy on hose, couplings, etc. Needs no special fluid—just ordinary motor oil.

Practically fool-proof. Self-bleeding—no air locks. Internal breathing—no outside breather to clean.

Fits present tractors. Available as factory equipment on "S," "D," and "LA" Series tractors or easy to install on earlier models.

Portable cylinder controls trailing plows, harrows, combines, pickers, etc. No chance of going down too far—adjustable stop on cylinder limits depth. It has no loose parts, adjusts without tools.

Raises and Lowers Fast

Operating this new hydraulic control is as simple as running hot and cold water into a bathtub—in fact, more simple because it has only one little lever instead of two handles. Drop in at your Case dealer and put it through its paces, yourself.

Push the lever all the way, and see the implement raise all the way—in a flash. Never mind the lever—it returns to neutral when lift is complete. Pull it all the way, and implement goes down swiftly with hydraulic power for positive penetration.

Move the lever part way, and the slow-motion slots in the one-piece control valve let a trickle of hydraulic power adjust the implement exactly as you like. Move the lever farther to make adjustment quicker. Let go the lever and the implement holds its depth right there.

Get this time-saving, strength-saving hydraulic control now—either on a new Case tractor or the one you now have. Send for catalog on the full 2-plow "SC," 3-plow "DC," or mighty 4-5 plow "LA." J. I. Case Co., Dept. J-90, Racine, Wis.

COMPARE THIS 3 H.P.
Simplicity
REG U.S. PAT. OFF.
FEATURE FOR FEATURE
DOLLAR FOR DOLLAR
NEW DESIGN
Briggs-Stratton engine for long-lasting, smooth trouble-free power
4-SPEED TRANSMISSION
Shift into the right speed for every job
PATENTED "QUICK-HITCH"
Exclusive feature for mounting implements in seconds without tools
All steel one-piece chassis. Rugged construction . . .
adjustable wheels
. . . YOU'LL SEE WHY IT'S AMERICA'S NO. 1 GARDEN TRACTOR!
3 H.P. MODEL "M"
$235.00*

were analyzed and the poison discovered there in large quantities. Many of the apparently dangerous plants, it was shown, were perfectly harmless growing elsewhere. Some of the common plants which will absorb selenium and become potential killers in these areas are arrowgrass, wild aster, milk vetch, white sage, euphorbia and poverty weed.

Plants vary in poisoning ability from season to season, such as Dutchman's breeches which is believed poisonous only in the spring; some have only a few or single part which is poisonous such as sneezeweed and cockle seeds. Plants vary in the effects of their toxic principles; bracken for example is a cumulative poison; the photogenetic poisons tend to increase the sensitivity of their victims; whereas the alkaloidal poisons create immunity if consumed in small amounts. Farmers can be lulled into a false sense of security by their animals apparent immunity or disinterest in a noxious plant, only to find they have a serious outbreak of poisoning when conditions change.

Livestock Susceptible To Poisons

While this article primarily concerns plant poisoning of cattle it is to be emphasized that all farm and domestic animals may be affected by plant poisoning. There are species differences. The cyanogenetic plants, hemlocks, laurels, locusts, and milkweeds are dangerous to all animals, while larkspur affects cattle and not sheep. Horses are particularly sensitive to the toxic principle in young growths of locust and they can develop depraved appetites for horsetail mixed in carelessly collected hay. Hogs are, of course, restricted in their pasturage and tend to be poisoned by low-growing plants such as cocklebur seedlings, and pokeweed and hemlock roots. The owner of sheep and goats can safely assume that most poisonous plants affect all ruminants similarly.

Here are listed the poisonous plants with their effect on all classes of farm stock: Larkspur—Poisons cattle only. Horses will not eat it and sheep will eat only a few varieties. Equisetum—Poisons horses and cattle with different symptoms for each type of animal. Arrowgrass—Poisons all types of animals under conditions of wilting or if plant has assimilated selenium. Bracken

Cattle and horses are susceptible. Laurel—Goats, sheep, cattle; horses. Jimson weed—Cattle and possibly hogs. Nightshade—All animals. Poison Hemlock—All animals. Water Hemlock—All animals. Lobelia—Cattle and possibly hogs and sheep. Sneezeweed—Cattle and sheep. White snakeroot—Horses, cattle and sheep. Cocklebur—Cattle, hogs, and sheep. Prunus—All animals which can reach wilted leaves. Black Locust—All animals which can reach bark and leaves. Horses are most susceptible. Johnson grass—All animals eating wilted or drought-ridden grass. Dutchman's breeches—cattle, horses and perhaps hogs. Pokeweed—Cattle and perhaps sheep and hogs. Dogbane—Cattle and sheep. Milkweed—All livestock.

Procedure In Case of Suspected Poisoning

When an animal shows acute symptoms of illness, the owner should know, and quickly, whether he is dealing with an infectious disease or poisoning and whether the upset is serious enough to need the immediate attention of a veterinarian. While it is not always possible to differentiate between infectious diseases and poisoning there are definite signs which are to be looked for in poisoning that are not present with an infection.

If there is a sudden onset of an obscure illness causing paralysis or convulsive movements, profound stupor, all affecting the nervous system, or acute digestive upsets, such as nausea, vomiting, diarrhea, all without visible cause and without accompaniment of fever, poisoning may be suspected. Any prolonged loss of weight without reason, loss of erect gait or staggering, or signs of large blood clots and hemorrhaging may indicate a cumulative poisoning. Other signs usually associated with poison are sudden speeding up or abnormal slowing of heart action, stomach and intestinal irritation, difficult breathing, and blueness of the mucous membrane, all without accompaniment of fever.

A simple way to determine the presence of fever is to feel the nostrils of the animal. If the muzzle is hot and dry that is a reliable indication of fever. A handy way for the amateur to determine the pulse of an animal is to run a hand over the animal's

"Mastitis* is no problem in my herd...I'm using SQUIBB INSTANT-USE PENICILLIN"

...says Clifford Baright of RFD 1, Poughkeepsie, N.Y.

"I have been using Squibb Instant-Use Penicillin ever since it first came out—a year and a half ago.

"It is the easiest and most effective treatment I've found, and it's keeping mastitis out of my herd of 55 Guernseys.

"I try to run my dairy farm on an efficient basis. I can't do that if I have to milk 'three-quarter' or 'two-quarter' cows, or lose cows entirely to mastitis.

"With good sanitation, fast milking and Squibb Instant-Use Penicillin on hand, I'm avoiding such losses.

"This is what we do. We always use a strip cup on each cow before every milking. If any cow shows heavy or spotty milk—or if a quarter doesn't 'feel right' after milking—we inject a tube of Squibb Penicillin before leaving the barn. Often, that one dose is all that's needed. Seems to me this ointment penicillin brings a quarter back to the 'right feel' and to normal milk more quickly.

"It is very easy to do this—and takes only a few seconds. The Squibb tube is small, goes into the teat very easily and the material flows out readily.

"I guess there are plenty of dairy farmers who've found this Squibb 'instant-use' tube a big help. Certainly, it would cost me a lot less to buy and keep 100 tubes on hand, rather than lose even one good milking cow to mastitis. And that's truer today than it was a few years ago. Every dairyman knows it costs *real money* nowadays to replace a good milking cow."

• • • • •

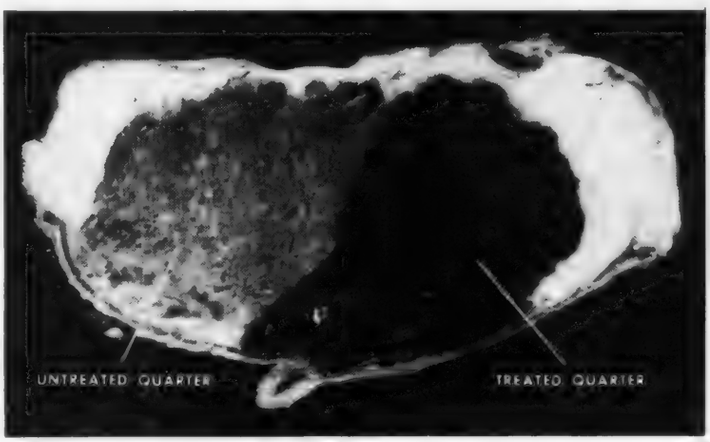
This statement from Mr. Baright is one of hundreds of similar comments we have received from dairymen everywhere.

You, too, can stop mastitis* losses in your herd and keep milk production up—by using Squibb "Instant-Use" Penicillin. Ask for it at your druggist's!

FREE BREEDING CHART! Handy—valuable for keeping breeding and freshening records. Write for yours—and for booklet on Mastitis Control. Address E. R. Squibb & Sons, *Veterinary and Animal Feeding Products Division*, Dept. FQ-39, 745 Fifth Avenue, New York 22, N. Y.

*Due to *Streptococcus agalactiae*, the cause of the largest percentage of all mastitis cases.

EASY TO USE! Simply unscrew cap, insert tip of Squibb Penicillin Ointment tube into teat, squeeze out ointment. That's all!



EFFECTIVE! A simple experiment, results of which are shown in this unretouched photograph, demonstrates how thoroughly Squibb Ointment disperses penicillin throughout a treated quarter of a cow's udder.

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Don't spend your productive work time doing other chores. Cut time spent replacing fence posts . . . use Penta-protected posts!

Treat your posts with Dow Wood PRESERVATIVE. It contains PENTAchlorophenol—the Dow chemical that protects wood from termites and decay.

All you do is soak your posts for 24 to 48 hours in a solution of DOW WOOD PRESERVATIVE and petroleum oil. Your empty oil drums will serve as containers for the soaking.

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neck close to the shoulder until the powerful pulsations of the carotoid artery can be felt and the beats per minute timed. A large animal normally has a slower pulse rate than a human. But if the farmer is in doubt as to whether the pulse is normal and he has other beasts in the barn he can compare the rates of the well and the stricken animals.

If a farmer is familiar with indications of good health—clear eyes, pink color of mucous membranes, firm, regular pulse, and breathing rate, cool, moist muzzle, firm flesh, and good muscle tone—any marked deviation from normal can be readily observed and checked for its meaning.

Treatment

Cases of severe poisoning should be treated by a veterinarian. A farmer with a little know-how can handle light cases himself. A modern farm should have in its first aid kit for animals epsom salts, castor oil, tannic acid crystals, activated charcoal powder or tablets kept in a metal container, and linseed oil or lard. The accompanying chart will indicate which of these items should be used in first aid. Epsom salts and castor oil are fast acting purgatives, whereas bran mash can be used where slow action is needed. Tannic acid and activated charcoal are both effective in neutralizing the effects of alkaloidal poisons. Charcoal is particularly valuable because it is harmless to the beast and will be effective in a great many poisons. In the absence of either of these strong tea can be brewed and used as a starting treatment. Lard and linseed oil are valuable where an oil antidote is called for, such as in cocklebur poisonin. Warmth, quiet and rest are important ing. Warmth, quiet, and rest are important to poisoned animals. Promptness is imperative.

While awaiting the development of poisoning symptoms the hay, pastures, and dumps should be examined for suspected plants. If the animal has had access to fresh paint or old paint which produces lead poisoning, cyanosis may be suspected.

Prevention Of Poisoning

Since few positive cures are known for plant poisoning, prevention is recommended by agricultural experts as the best means of combating loss. Animals in carefully controlled pasturage are much less frequently poisoned than those on open ranges. Wise dairy farmers also regularly plow their pastures and resow them with forage crops. Animals are best able to avoid the temptation of browsing on dangerous plants if they are not sent into the fields ravenously hungry.

Drought and early frost present special problems and most farmers do feed their animals supplementary feeds at such times. But it is at these times especially that there is danger from sorghums and grasses such as Sudan, Johnson and velvet grass which, if cut for extra forage and

new! Revolutionary

Ridemaster Seat

on OLIVER tractors

Close-up of the cushiony rubber torsion springs that absorb the jolts, soak up shocks and level out rough rebounds.

The new *Ridemaster* seat is adjustable, too—provides utmost comfort for a farm youngster of 100 pounds or a husky driver hitting the 275-pound mark. It is also adjustable fore and aft to suit leg length. Moreover, co-lateral cushioning softens side-rock.

Cushion, as shown, slightly additional.

Get over to an Oliver Dealer and take a ride on an Oliver Tractor and you will find that *real comfort* is now for the first time available to the tractor driver.

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The *Ridemaster Seat* is different from any other seat ever put on a tractor—you haven't seen anything like it before or experienced the comfort it can give you. So get over to your Oliver Dealer, learn about another Oliver contribution to better farm living and working.

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Spark plugs also look alike, but

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TRANSPORT SPARK PLUGS

are ignition engineered for farm use

IF YOU find it hard to tell which is glamorous Joan Bennett, it's no wonder you are confused when you try to select the best spark plug from outside appearance. But if you pick the new Auto-Lite Transport Spark Plug you get a spark plug ignition engineered especially for trucks and tractors.

The heaviest electrodes of any spark plug made...

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for longer life... more uniform performance

If you believe the girl at the bottom is the real Joan Bennett, star of Columbia's "The Blank Wall," you are 100% right. The picture on the top shows Miss June Cox of New York City. You can score yourself another 100% when you switch to the new Auto-Lite Transport Spark Plug, the plug that gives you the heaviest electrodes of any commercial spark plug.

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allowed to be trampled by the cattle and to wilt, will cause great damage. Ample warnings have been sent out by agricultural stations, but not long ago a farmer in Pennsylvaia reported the loss of a dozen hogs from wilted Sudan grass poisoning.

Here are some rules of thumb to be used in searching for poisonous plants. Those plants having milky juices, strong or pungent odors, and acrid or strong tastes, should be suspected. Berries, seeds, especially those in pods, bulbs and tubers, frequently harbor dangerous poisons. Spoiled, fermented, fungus-infested or sprouted plants should always be suspected. Numerous ornamental plants cultivated in or around the house contain dangerous poisons. Among these are the castor bean, delphinia, lily of the valley, flag iris, oleanders, foxglove, English ivy and opium poppies.

THE AUTHORS

The Matsons, a chemist-biology-literary team, have the ideal combination of talents for such articles as *Poison Weeds*. Dr. Edward Matson is a research chemist for the Abbott Laboratories, Chicago; his wife, Virginia, was formerly a biology teacher and head of the science department at Chicago's Wells High School. *Poison Weeds* represents months of research and checking into a subject about which little has been written.

THE HYBRID CHICKEN

(Continued from page 38)

characteristics begin to show up. Freaks with beaks that cross instead of meeting, blind birds and birds with pendulous crops, twisted neck star gazing birds, birds with bald heads or bare backs, all show up in the hatch as the recessive genes in the hereditary make-up of the parents are exposed. As these undesirable traits become visible they can be eliminated. Less apparent faults such as a tendency to broodiness or blood spots in the eggs are also exposed and eliminated.

When flocks are culled to a point where less than a dozen birds survive out of a hundred started, it would indicate that the geneticists know exactly what they are searching for as well as what they want to eliminate. They do. They compare each generation of inbreds and keep those showing the fastest rate of growth and feathering. Later, when they have matured, they check the adult body size, egg production, egg weight, the quality of yolk and white, shell color and shell texture. These comparisons must be made with other birds having the same degree of inbreeding since the process of inbreeding cuts down their vitality. When the hen is in production they check her further to see if she passes on the desired characteristics to her chicks.

When the corn breeder reaches this stage with an inbred line he can bottle it up and store it in a cool place indefinitely. The poultry breeder must continue the line generation after generation if he wants to hold onto it. He is plagued with innumerable problems such as deeply buried recessive characteristics coming to the surface, high death losses among the inbreds whose vitality is lower than the ordinary chicken's, and even a change in type due to the fact that the law of the survival of the fittest may cause the line to draw away from the desired standard. As soon as desirable inbreds are found the job of crossing them with other inbreds begins and here the element of chance enters the picture.

The Nick

When two inbred lines are crossed there is no assurance that they will produce a good hybrid. Hundreds of different crosses of inbred lines may have to be made before two are found that produce the desired characteristics in the offspring, or, as the breeders say, they "nick."

To illustrate the problem of making a successful nick, Dr. E. E. Schnetzler, the head of the DeKalb poultry project, says, "A nick is like finding a key that opens a lock. We work with hundreds of keys and hundreds of locks and when we try a cross of inbreds we can't predict that we have the right key for the particular lock. To continue the analogy, if the key opens

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FALL is the ideal time to test your soil! You'll want to use your Sudbury Soil Test Kit in every field just as soon as it comes. Not only will crops be bigger and better next year—you'll actually save money because the tests show exactly what each field needs for the crop you plan to grow. There is yet time to correctly fertilize the crops you put in this fall. Experiment station tests have even proved it is highly profitable to test and fertilize meadows and pastures.

Some farmers waste lime where it's not needed—others don't use half enough. With your Sudbury Soil Test Kit you know just what is right. Some fields may need twice as much phosphate as others. 10-minute tests right on your own farm tell the exact proportions of nitrogen, phosphate and potash to apply, so the fertilizer you buy this winter or next spring will give you bumper crops in every field next summer.

Easy to do expertly... No Knowledge of Chemistry Needed

Get Back $3.00 or More from Every Fertilizer Dollar!

Test your soil and you can get back up to $3.00 or more from every dollar you spend for fertilizer. Trials on seven fields in Illinois proved that every $14.42 spent on potash and phosphate paid off $43.00 in extra crop yield. In Maine, testing and fertilizing pastures increased milk production of a herd from 33,000 lbs. to 43,400 lbs. This brought $370.00 additional milk receipts per year, at a cost of $74.00 for fertilizer—$296.00 extra profit just by following soil tests! In Tennessee, cost of producing wheat dropped from 69c a bushel without fertilizer to 32c a bushel with fertilizer.

Save Time, Effort, Money

Soil tests save much time, effort, and money often wasted using wrong kinds and amounts of fertilizers. An Illinois farmer saved $500.00 by using 125 tons of limestone instead of the 360 he *guessed* his soil needed. This saved enough money to buy all the phosphate which tests showed he needed on 65 acres.

—Photo Courtesy Wisconsin Agricultural Experiment Station

As this picture shows, even after liming and using phosphate where soil tests showed they were needed, also adding potash raised corn yields greatly. Balanced fertilizer guided by soil tests can produce 100 bushels per acre, even up to 150!

Raise Healthier Stock

A famous Virginia stable, after producing generations of champion race horses, was fast losing ground in spite of careful breeding. Fewer and fewer winners were being produced and frequently foals were deformed or stillborn. Soil-conscious, the farm's manager had tests made which showed the blue grass lacked phosphorus. Superphosphate was applied, and even the next season the tide changed. Now the stable is back in the running.

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Whatever crops you plan to raise, you can make them show just as marked improvement if you test your soil and make it right the Sudbury way. It's a lifetime investment—the soil is the backbone of your farm; more important than all your buildings, implements, and stock.

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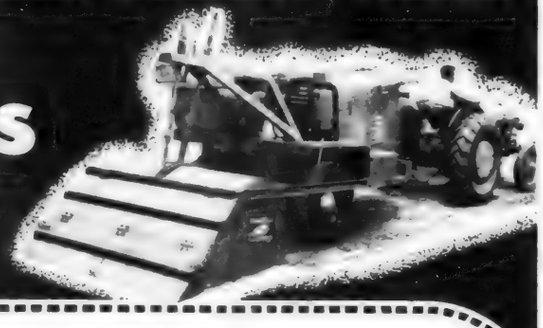

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the lock we know that the genes of the two inbreds complement each other and a good hybrid is produced. But the chance that you will hit a nick is rare and you must keep trying every possible combination."

The Double Cross

When the breeder produces a successful nick he has a hybrid that carries all the desired characteristics of the parent inbred lines plus the boost given by hybrid vigor. But the poultrymen are confronted by the same problem that haunted the producers of hybrid corn: the inbred stock won't produce enough offspring to make the project worth-while financially. Their solution is the same as the corn grower's. They cross their first hybrid with another single cross hybrid whose ancestry is unrelated to the first and try for another successful nick. A second way to produce the commercial hybrid is the three-way cross, where the single cross hybrid is crossed with an inbred line rather than with another hybrid. The possible number of crosses is large. Starting with 50 inbred lines, for example, there can be 1225 single crosses, 55,272 doubles crosses, and 58,800 three way.

The Reluctant Salesmen

When successful nicks are made and breeding stock increased to the point where the hybrids can be produced in a big way, the breeders are in a position to take their product to market. During the 1949 season the Hy-Line Farms sold over 15 million chicks and hope to go to 20 million in 1950. DeKalb has not released their production figures. Neither company, however, is going in for splashy advertising or making any undue claims for their birds. As a matter of fact, the greatest fear of both organizations seems to be that the public might get an exaggerated idea of the new chicken. To many farmers the word "hybrid" is magic.

H. B. Wallace, the head of the Hy-Line Farms, is the serious minded son of the former Vice-President. In appearance he is a young duplicate of his father and has gained from him his keen interest in genetics. Apparently politics was a recessive characteristic in the Wallace genes for the younger Wallace takes no more than casual interest in affairs of state. In selling his chicks he attempts to keep from overselling by limiting his advertising claims to records of production and statements by farmers that are little more than a blunt, "We have raised Hy-Lines and we like them." Among the Hy-Line production records is a list of the results achieved by 91 farmers in the annual Hy-Line Farm Flock Contest. The records are made on a hen-housed basis, that is the average number of eggs laid by each of the hens housed at the beginning of the season without subtracting the birds that were culled or died. (The hybrid raisers all prefer this type record, incidentally, since they feel it is the way the farmer must judge his flock to be practical and also this

method shows the uniformly high records and livability of the hybrid chicken.) The winning flock in the 1947-48 Hy-Line contest turned in a record of 270.9 eggs laid for each bird housed. The 91 flocks together consisting of 21,157 pullets averaged 222.37 eggs per bird. Wallace, however, is quick to point out that these figures are loaded since this was a contest and since people who keep careful records are usually the better farmers. He is far prouder of the record made by Hy-Line chickens in the Iowa Record Demonstration Flock Project conducted by the Iowa State College. This study showed that four flocks of hybrids netted their owners $3.88 per hen; four flocks of White Rocks netted $1.33; seven flocks of New Hampshires netted $1.44; and nine flocks of Leghorns netted $.70 a bird. To do this the hybrids have averaged 247 eggs per bird housed, and consumed 5.3 pounds of feed for each dozen eggs produced while the other breeds all averaged well below the two hundred mark in eggs laid and all consumed over seven pounds of feed per dozen eggs. Wallace pointed out, however, that the Hy-Line customers tended to follow better management practices, so that this production advantage was not all due to Hy-Line breeding methods.

The Hy-Line people have seven different hybrids on the market, all bred for egg production. In appearance they run from nearly white with an occasional black feather to an over-all reddish-buff color. The different crosses also differ in egg production in winter, summer and fall; in rate of maturity, egg weight, body weight, nonbroodiness, and in the texture of the egg shell they produce.

Three different breeds are used to produce the inbred lines that go into the present Hy-Line bird, Leghorns, Rhode Island Reds and New Hampshires. One single cross hybrid parent is made by mating two inbred lines of Leghorns, the other single cross parent comes from inbred lines of the other two breeds.

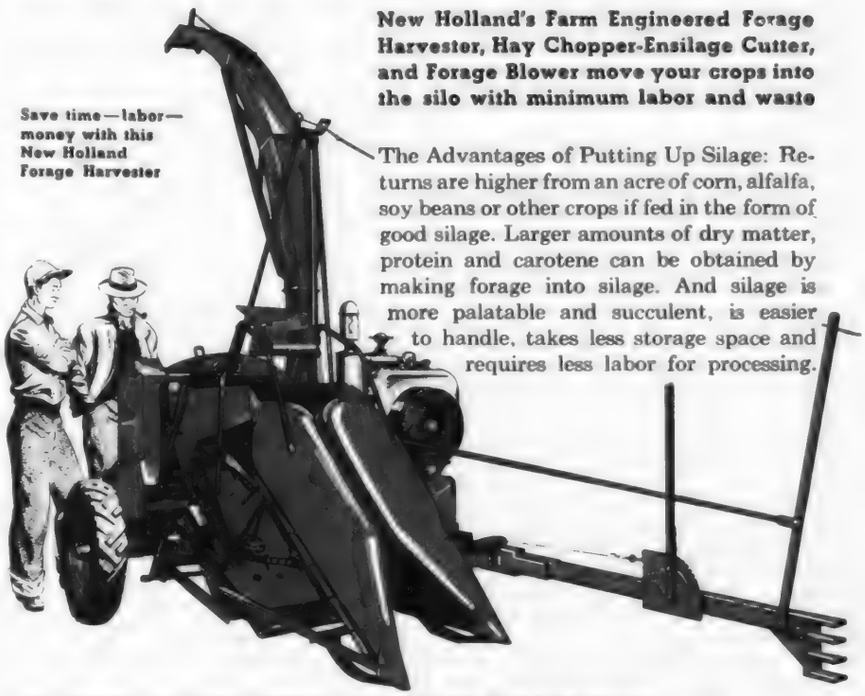
DeKalb has eight different hybrids ready for commercial production. Three of the DeKalb lines are bred for egg production; three are dual purpose chickens; and two lines are broiler chickens. These broilers are bound to run into stiff competition from a number of the fine new crossbred chickens developed by various breeders who have been stimulated by the "Chicken of Tomorrow" contests. Most of the birds entered in this contest are crossbred chickens, not hybrids. DeKalb knows this, but feels that there is plenty of room for all breeders to work for the improvement of the industry. "We don't want to give the impression that we feel that hybridization is the only way to get better results," DeKalb's Schnetzler says. "It is just one line of breeding that we feel will show good results."

Though the DeKalb chicks have not yet been put on the market they have been testing them extensively under farm conditions where they can be compared

FOR PROFITABLE FARMING—

Get better silage faster—at less cost—with these proven NEW HOLLAND Forage Machines

New Holland's Farm Engineered Forage Harvester, Hay Chopper-Ensilage Cutter, and Forage Blower move your crops into the silo with minimum labor and waste



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The Advantages of Putting Up Silage: Returns are higher from an acre of corn, alfalfa, soy beans or other crops if fed in the form of good silage. Larger amounts of dry matter, protein and carotene can be obtained by making forage into silage. And silage is more palatable and succulent, is easier to handle, takes less storage space and requires less labor for processing.

New Holland's great Forage Harvester moves feed crops from field to wagon to silo in one operation. Cuts clean, uniform lengths from 3/16 in. to 4 in. Slices like a knife—does not squeeze crops as in ordinary, scissors-type machines. Changes from row to windrow attachment, or back, in only 30 minutes!

The New Holland Forage Blower gets crops into the silo Fast

Pile forage onto the extra-wide feed table of your New Holland Heavy-Duty Forage Blower. Positive feed, 140-square inch throat opening. Rapid blowing up 8" pipe. Handles up to 25 tons of corn per hour—up to 20 tons of hay!

New Holland's versatile Hay Chopper-Ensilage Cutter

The New Holland Hay Chopper-Ensilage Cutter feeds, cuts, blows corn, hay or other crops to silo or mow. Extra-wide table. 112-square inch throat opening. A versatile, high-capacity machine.

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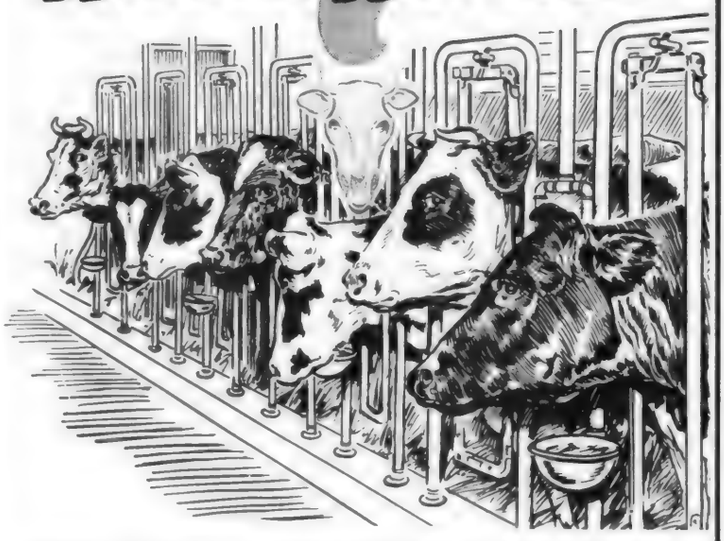
*Name*_____ *Street or RFD*_____

*City and State*_____ *County*_____ *Acres farmed?*_____

Which ONE is marked for "HIDDEN HUNGER"



Sure, they *all* may be deep bodied, healthy producers and reproducers *today*. But . . . will they continue to be next month—next year? Or, will one, or *more*, be marked by:

"HIDDEN HUNGER" *Lack of essential mineral elements needed by livestock for sturdy health, rapid growth, peak production and reproduction.*

Don't take a chance with future stock health or *your profits*. Feed Near's MinRaltone daily, throughout the year. It protects stock against "Hidden Hunger" because it supplies 11 essential mineral elements (plus Vitamin D) which may be lacking in the daily ration. Write for free literature which tells all about the 3 WAYS to feed MinRaltone year round.

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with standard bred flocks. In 1949 alone, DeKalb put out 600,000 of their chickens, mainly to the farmers who are dealers for their hybrid corn. Wherever possible these chicks were raised with a flock of standard breeds and careful monthly records were sent to DeKalb for analysis. They feel that their egg laying lines will produce about 30 per cent, or about four dozen more eggs a year, than the national average and that their broilers are ready to convert feed at a fast economical rate into good white meat. Their present goal is a three-pound broiler in 10 weeks.

What, No Faults?

The breeders of these productive hybrids will certainly admit that their birds have some faults. Some of the people who have bought them are downright anxious to list the bad points. R. E. Hagans, a neighbor of Milford Byler's, bought several hundred hybrid chicks the year before Byler did and wouldn't have another hybrid on the place. "They laid their heads off, just like the dealer said they would," Hagans says, "but they were the flightiest bunch of birds you've ever seen. You couldn't walk past the door or window without having the whole flock fly all over the place. It got so that they were making a nervous wreck of me. They say that they are no more nervous or flighty than a flock of Leghorns, but there's another bunch I wouldn't want to own. I want a nice quiet chicken that takes it easy."

Another complaint that is often heard is that dealers dock the farmer on egg prices because of the color of the egg. Most of the hybrids lay an egg that is slightly tinted, not white enough for the New York market or brown enough to satisfy the people of Boston.

Around chick buying time there is a good deal of grumbling about the price you must pay for the hybrid. It's easy enough for the dealer to tell the farmer that his hybrids will more than make up for the difference in price, but it takes actual experience to convince him. At present the price for laying hybrids is 31 cents for unsexed birds and 62 cents for pullets. The cockerels in this group are a drug on the market; most of them are sold to backlot broiler raisers and in some commercial areas for around eight cents, part of them are drowned at the chick sexing tables.

The Federal Trade Commission has already stepped into the picture to try to prevent a misuse of the word hybrid. Many poultrymen, however, feel that the F.T.C. has done little to clarify the picture. They point out that it is permissable under the F.T.C. rules to call a crossbred a hybrid as long as the two breeds which have been crossed are listed. If the word "hybrid" is used alone it is supposed to mean that the chick is the result of crosses of inbreeds. This muddled situation has caused the breeders to depend on their own trade names rather than on the word hybrid. The Pioneer chicken is called Hy-

Line and their advertising carries the slogan, "First chicks bred like hybrid corn." Another Iowa breeder sells under the name Ames In-Cross, and DeKalb will put their chick on the market simply as The DeKalb Chick and rely on their reputation in corn to put the hybrid idea across. Until the F.T.C. or the state governments clarify the use of names it would pay the poultry buyer to investigate carefully the "hybrids" that are offered for sale.

The Work Goes On

Though DeKalb and Pioneer have been used to illustrate the problems of the hybrid breeder they are not the only producers in the field. They are probably the only ones set up for national distribution of the new hybrids, but there are a number of smaller breeders who have developed hybrid chickens or who are working on this problem. In addition to the commercial producers the USDA has been developing and testing hybrid chickens at Beltsville and at the state experiment stations. The government may eventually release parent stock to breeders as they did with corn inbreds, but they will not produce hybrids for sale to the farmer.

Though there are several good lines of hybrid chickens on the market or ready for sale, the breeders don't feel that they have the whole problem whipped. Their breeding programs are still in full swing in the hope of finding new lines that will push their present lines out of the running.

In the meantime farmers are raising the new chicken. "I would no more think of giving up the hybrid chicken than I would of going back to open pollinated corn." says William Knoff, speaking as one satisfied customer. "I'm sold on them. When I give up hybrids it will be because I'm going out of the poultry business."

BROOMCORN

(Continued from page 85)

machine or I can do it myself if I have to and not get down on knees to beg anybody to help me. But broomcorn you can't work that way. You've got to hire labor, and plenty of it, to harvest the crop. This last year workers were walking off my field at the end of the day with $32 in their jeans for a day's work, and all you need to be a broomcorn harvester is a strong back, a weak mind, and a fifty-cent broomcorn knife!"

Rennels twisted the extra thumb on his double-thumbed cotton gloves as he talked, "The way you harvest broomcorn hasn't changed a bit since the days when my daddy used to grow it. You still table, it, cut it, thresh it, cure it and bale it, and the machines we have are about the same as he used. Mostly it is just a muscle job. To make a table you walk backwards between two rows and break the stalks forward diagonally in front of you so that

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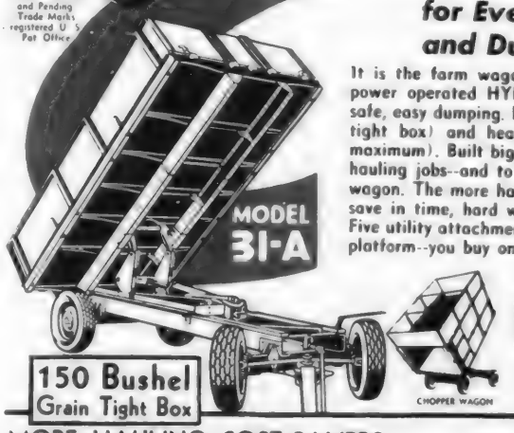

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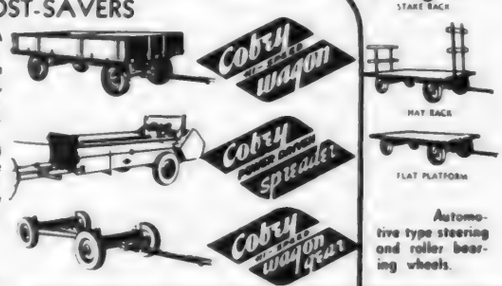

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they cross, and the brush from the left hand row sticks out beyond the right hand row, and the brush from the right hand row hangs out on the left side. You have to table so that you can get at the brush easily, so you make the break about waist high. We all plant our rows 80 rods long so when a man finishes making a table he has two rows broken down to form a flat table a quarter of a mile long with the brush hanging over the edge. Then he comes back up the row cutting the brush on one side and then down the other. A good cutter can cut from three to five tables a day and you pay him by the table. The price has gone from around $3.50 to $6.25 a table and last year we paid $8 toward the end of the season. You see why some farmers are giving up the crop?

The dump wagon rides down the tables and a man on each side of the wagon piles on the brush.

The loaded dump wagons bring the brush from the field to the thresher, a power-driven device that has revolving, toothed cylinders that comb off the seeds. In front of the thresher is a T-shaped table where the brush is prepared for the thresher. First, the brush must be separated into small bundles by two bunch cutters who hand them to four men who untangle the brush and straighten it out. The brush then goes to two butters who butt the bundles, seed head down, to even them for the thresher. When they have butted the bundle and made it uniform, they pass it on the feeder who runs it through the thresher.

It takes from 10 days to two weeks of dry weather to cure the brush. After it is cured it is baled and, here again, it takes man-power to do it. A crew of 10 men take the brush off the shelves, butt it, and lay it in the baler with the brush end in. When the bale is compressed it is bound with wire and is ready for shipment. A horse is generally used to power the balers.

"I plant two different varieties," Rennels continued, "in order to stagger the load at harvest time. Black Jap, they call it Black Spanish now, and White Italian. The Black Jap is ready about two weeks before the Italian and you can harvest it and have it out of the curing sheds before the Italian is ready to cut. The Jap has a bad tendency to fall down and it will crook a lot more than the Italian. Crooking is when the brush grows so fast that the tender bottom part is too weak to hold it up and it bends over. Once it crooks over you can't straighten it out and you get docked for it. The Jap also has shorter brush, which doesn't bring quite as much, but you can harvest it early when labor is cheaper and you can cure a bigger crop in your sheds this way.

"With the changing cost of labor and the occasional attack of root-rot it seems you either make a pot of money or lose your shirt on broomcorn."

Rennels' description of broomcorn harvesting would apply to Illinois and Oklahoma but not to the Western region. There the major crop is the dwarf variety which doesn't need to be tabled for a man to reach the brush. They don't have to cut the brush either, for a man can give it a jerk and pull it out of the boot. The threshing process is much the same, but instead of curing the brush in sheds the dry climate permits them to stack it in ricks in the open for curing.

Marketing The Brush

"One of the difficulties in buying broomcorn," Thomas Monahan, a broker, says, "is that there are no standards for the crop. The Department of Agriculture tried to work out a government grading system for broomcorn but gave it up after 10 years. It reached the point where in one bale they found 320 grades of brush. The brush from two plants growing side by side is different and the brush from two fields or two broomcorn regions is even more different. In general we classify the brush into these groups: Insides Crop, which is mainly rough, shorter fibers to be used inside the broom; Hurl, the smooth long fibers that go on the outside of a broom; Self-Working Crop, which is

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like its name, a crop with enough Insides Crop and Hurl to make up a whole broom; Whisk, shorter, finer fibers that are used in the whisk brooms; and Warehouse which are the very coarse long fibers. The trouble is that you may find all of these general types in a single bale. The best we can do is to look over the outside of the bale to check for color and pull samples from it to get an idea of the average type and quality of the brush and then hope we are right."

As soon as the brush is harvested most growers plow under the stalks, which are still green. If they wait too long the stalks become tough and hard to manage and break down in the soil more slowly. Rennels figures that he can plow under four tons of humus if he gets to it with the plow as soon as the crop is in; otherwise, it has to be burned off the land.

The seed that is threshed from the brush is generally scattered over the field as fertilizer. Since the seed is threshed in the early dough stage it does not produce a volunteer crop. Some Illinois farmers feed a little seed to chickens, but don't care much for it. In Oklahoma feeding tests conducted by Dr. C. P. Thompson of the Oklahoma Agricultural and Mechanical College showed that dried ground seed was worth 69 per cent of corn when fed as a quarter of the ration to pigs.

Almost all of the seed for planting in the United States is raised around Arcola, Illinois. The real difference between growing the crop for seed and for brush is the time of harvesting. The seed growers let the seed ripen in the field, which is bad for the quality of the brush, but, to them, the brush is only a by-product.

Farmer Broom Makers

A few growers hold back part or all of their crop of brush and, in the winter months, make up their own brooms for sale. The machinery needed to turn out a broom is so inexpensive that these buckeye shops, as they are called, can be set up for as little as $50.

"Billy Bugh, an old fellow who died a few years ago, used to have another product that he sold from broomcorn," P. A. Lindenmeyer, editor of Broom and Broomcorn News, said. "He used to go out in the fields after harvest and split the stalks and whittle out the pith. He got a nice price for it from the metal polishing industry. No one has the patience to do it any more; as a matter of fact fewer and fewer farmers are willing to put out the effort and hire the labor to raise broomcorn. I have talked to several of the growers and their average cost last year ran around $50 an acre, $9 for preparing the land, 75c for seed, $2 for cultivation and $39 for harvesting, curing and baling. Some of the growers were grossing $300 to $350 an acre, so, you see, they make more on it than on most other crops, but they would rather get less and raise a crop they can handle with machinery."

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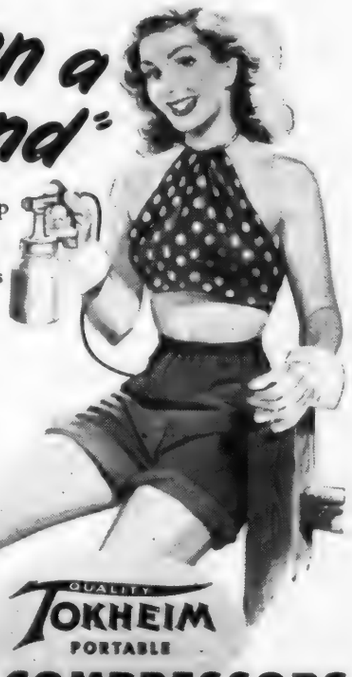

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LIME UP TO DATE

(Continued from page 87)

pushes its way into a crowded molecule, other elements are forced out, and become food for plants.

Acidity Can Be Added, Too

Now that we know that we need limestone in our soil, and we know that limestone has a bad habit of making soils less acid and more alkaline, what can be done about preventing or offsetting the undesirable alkalinity? There are several methods of accomplishing this necessary task. Some are quick; others are slow. Some are costly; others are cheap. But no matter what method we select we will be offsetting or preventing alkalinity by adding or by keeping some acidity, and when we keep or add acidity we are keeping or adding the vital hydrogen contained in that acid.

Prevention is simple. In putting limestone on the soil we must not add carbonate or alkalinity equivalent to the acidity originally present. We must keep some acidity on hand there. If excessive limestone is added to the point where no acidity exists, then acid must be restored to the soil. Theoretically, this could be accomplished by spraying dilute sulphuric acid on the soil. A slow method is to spread powdered commercial sulphur. Sulphur will do its work regardless of whether it is plowed under or left upon the surface. The sulphur slowly but constantly forms sulphurous acid, which is a milder acid than sulphuric acid; since we are after acid in our soil, to offset the alkalinity of the limestone, acid is what we are getting. Another method is the substitution of "gypsum" (calcium sulphate) for limestone. This salt will provide our soil with calcium, and at the same time will prevent the soil from going over on the alkaline side of the pH scale. Gypsum costs more than limestone, but gypsum needs no supplement to prevent the soil from becoming neutral or too alkaline. However, it is necessary to bring out the important point that limestone cannot be used excessively and successfully by itself; so let's get on with the story, and we will see why limestone, alone, will put your farm on the shelf.

The type of agricultural lime added to the soil is also very important. Calcitic limestone, for example, has the tendency to make magnesium unavailable to plants. The use of dolomitic limestone gets around this fault and also supplies magnesium, a very necessary plant food.

Minerals Released by H Action

Acid soils are soils which contain more of the acid H units than they contain of the alkaline (OH) units. Soil contains minerals, and in the minerals are metals such as potassium and phosphorus, cobalt, manganese, magnesium, copper, zinc, and iodine. These metals, weathered out of minerals by nature, are packed into the

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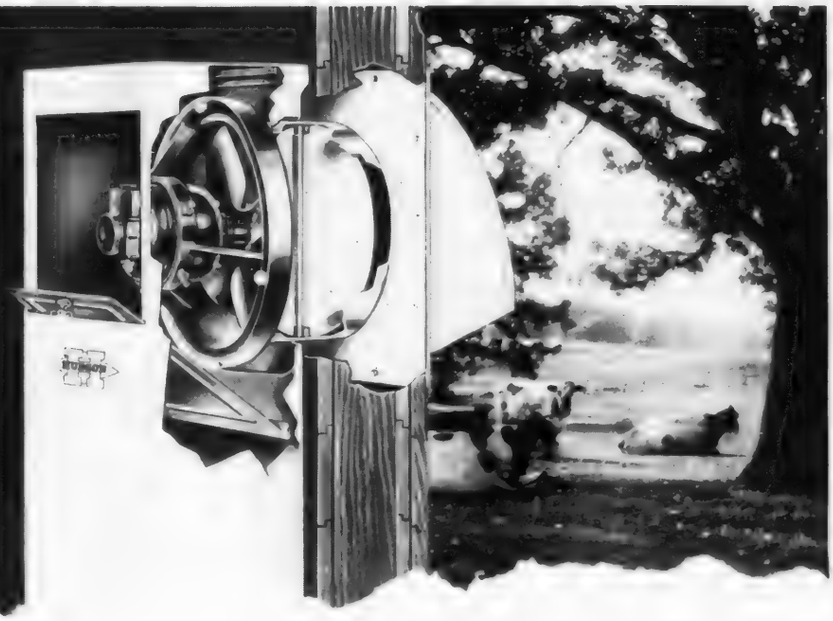

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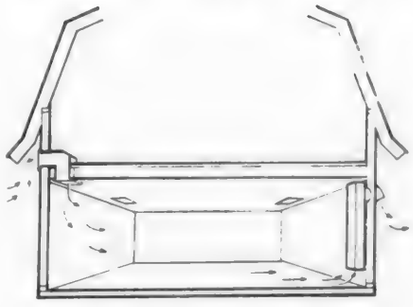

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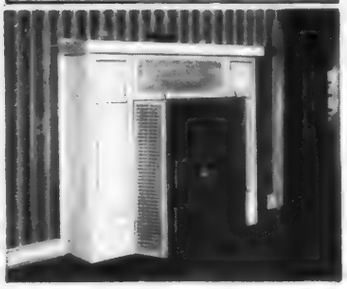

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clay of the soil. Metals and hydrogen do not get along well together. In school we are taught that the hydrogen in acids will go after a metal, but what really happens is that a metal goes after the hydrogen in that acid. So, when we have an ample amount of the H units in our soil we can be certain that the clay will make a "deal" with the H units, and the deal is to exchange a unit of metal for a unit of H. At this point the metal is no longer bound to the clay. It "goes on the road", we might say, in search of a home. It has been pushed out to become active, and is thereby available for absorption by the root of the plant.

But look at what happens when our soil is neutral, which means there are just as many (OH) units in the soil as there are H units. Each H unit has a very strong liking for an (OH) unit, and since there are enough (OH) units to keep every H tied up, no deals for metals can be made with the clay, and no metals come out of the clay; therefore, the roots of the crops do not get as much metal as they need to feed themselves, and to feed humans and animals. Such crops are "empty" foods, because they cannot make sufficient protein, enzymes, vitamins and other essentials we have not yet discovered.

When our soil goes over to the alkaline side there is a surplus of (OH) units and even though the roots of a crop have the wonderful ability to excrete H units for the purpose of helping the plant to get metals into it, the plant starves because as fast as the roots excrete the H units, these H units are grabbed by the excess (OH) units to give nothing but water. Because limestone has the ability to create (OH) alkaline units, and because limestone puts vital, important calcium into the soil, the time has come for every farmer to pay close attention to the degree of pH of his soil whenever he applies limestone or lime to his soil, lest he make his soil neutral or alkaline, and the calcium he applied be less active than when acidity accompanies that calcium. An acid soil is a desirable condition. It is worth repeating here that acidity in soil is a fundamental and important principle upon which nature does her best to grow crops filled with food value.

High soil acidity, by *nature*, means low soil fertility. Consequently, it means also low-quality yields, and usually also low-quantity yields. Adding some single element of fertility may bring about high-quantity yields, but only plenty and well-balanced fertility additions to a soil left acid and not alkalized *completely* by that treatment can give high-quality as well as high-quantity yields. These are the facts that call for the help of soil testing. It is the soils of ample and balanced fertility *with some acidity* that make a high-quantity of high-quality products.

Litmus paper has been used, and still is being used, to tell whether soil is more acid than alkaline, and vice-versa. But litmus paper will not tell you how MUCH more acid than alkaline; neither will litmus paper tell you how MUCH more alkaline than acid. When your soil is tested an accurate pH testing kit which will show the difference between a pH of 5.5 and 5.6 and 5.7 and 5.8 and 5.9, etc. should be used. These close ranges are important because they will show you exactly what degree of acid is present to ward off the alkaline quality of limestone.

To apply limestone, or lime, in such quantities that we reach the point of excessive alkalinity, is very much like buying a new automobile, and then taking off the wheels to prevent the automobile from wearing out. It is true that the automobile will not wear out, but you have labored for something which will be of little use to you. Likewise, when we put limestone on soil, year after year, to the degree of bringing about the alkalinity of that soil, we are unknowingly reducing the yield, lower and lower, year after year, until we are operating at a loss instead of at a profit, and this is what we mean by the statement, "Limestone, by itself, will put your farm upon the shelf."

Accurate Soil Tests Needed

This new approach to limestone application will result in some radical changes in farm practices. A soil testing service much more accurate than is available at present is one of the first recommendations. A second must is to apply just the right amount of lime for the crop to be planted. For alfalfa and clovers and other crops that like soil on the sweet side, a careful balance should be the goal, a balance which will leave some acidity along with the alkalinity. It may be that after the acidity is reduced, a change to gypsum should be made, or sulphur or other acid-producing material should be applied. The main thing to remember is that too much limestone can be applied, either at one application, or that constant applications year after year, without offsetting the alkalinity, can accumulate too much and the soil will stop, or diminish, in production.

We might sum up the functions of limestone thus: (1) To provide plant foods, (2) to *reduce* the excess acidity for the benefit of a few special crops.

Some soils are so acid that a form of limestone should be applied to reduce the acidity as well as to supply plant food. However, a soil may be acid and still have a high exchangeable calcium, in which case it would be unnecessary and useless to add calcium except as a plant food.

It is difficult for a person who has only a layman's knowledge of chemistry to understand how acidity and alkalinity can exist side by side in the same soil, since it is implied that one neutralizes the other. Pure water is an example of this; it contains exactly the same number of H units

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IF you live in Texas or have visited there, you have probably tasted some of J. H. Youngblood's chicken. His restaurants in Waco, Dallas, and Austin are famous. This Ford Truck user's slogan, "We hatch 'em . . . grow 'em . . . prepare 'em . . . fry 'em," stands for some of the most tender, delicious, full-meated chicken you'll find!

He figured that in order to make money out of chickens, you have to control every step in production and marketing. And he did! Today, Youngblood's operation covers the entire Southwest . . . has grown to where he needs 20 Ford Trucks in his business.

"WE START with the hen that lays the egg." Youngblood (right) and one of his managers examine a New Hampshire-White Leghorn chick. 65,000 of these special crosses are hatched each week. And a carload of mixed feed comes from the company's mill every day to feed them!

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◀ **"MY FLEET** of 20 Ford Trucks gives me fast, reliable transportation," Youngblood (right) tells Ford Dealer Jack Kultgen. "But my special pride and joy is this 145-h.p. Big Job which delivers to almost every large city in Texas." "You've chosen the best, when you've chosen Ford," remarks Kultgen. "We've got over 150 models! Pickups and Stakes for your farm work! Big 39,000 lb. G.V.W. Fords for intercity hauling—all Bonus Built!"

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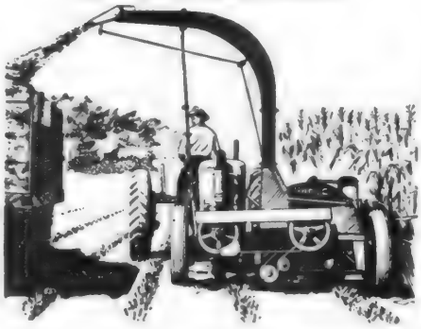

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as it does (OH) units. There are many soils with a pH as high as 7.6 which raise fine crops. The Red River Valley in Minnesota and the Black Land soils of Texas and Alabama are alkaline and they grow excellent crops. In these soils, however, there is sufficient acidity present for good plant growth. It is when soils are excessively acid or when not enough alkalinity exists, that calcium should be added to supply the alkalinity or reduce the acidity.

Few soils can be over-limed for field crops. Truck gardens and greenhouses sometimes are over-limed, but this is a question of imbalance rather than acidity destruction. The goal towards which every farmer should aim is the proper balance of acidity and alkalinity for the crops he is growing and the application of the proper amount of calcium for plant food.

THE AUTHOR—Dr. Wm. A. Albrecht, chairman of the Department of Soils at Missouri College of Agriculture, is the author of many scientific and popular articles on soils and soil fertility. Regarded as one of the world's leading soil scientists, he has spearheaded the efforts of scientists to bring a practical application of scientific research to the farmer. "Lime up-to-Date" is an example of his interpretation of scientific truth for inquiring minds. It is an example, too, of independent thinking and his courage in opposing old theories when those theories are questionable.

SWEET CLOVER

(Continued from page 35)

manure crop. The time to plow it under as a green manure is determined largely by the purpose for which it is grown or by the place it occupies in the rotation.

If grown mainly for restoring the fertility of badly depleted soils, it is usually allowed to go to full flowering stage or maturity before being plowed under. The biennial sweet clovers grown as a green manure for corn and other cash crops are generally plowed under in the spring of the second year. To obtain maximum soil improving value it should be plowed under when the new growth is from 6 to 8 inches tall, for at this stage the maximum quantity of plant food is stored in the tap roots and young shoots. More active organic matter is added. By plowing later the farmer adds more organic matter to his top soil, but no more fixed nitrogen.

Fall plowing of first year sweet clover is a valuable practice, especially when winter wheat follows, and in some sections with corn. However, the plowing under of first year biennial clover has two real disadvantages. The clover is likely to volunteer and be troublesome in the succeeding crop unless the crowns are severed from the main root. If the fall plowing is done early, there may be less danger of volunteer plants, but the maximum quantity of fixed nitrogen will not be obtained.

Annual sweet clovers, which are used extensively in the Southwestern states, especially Texas, when fall sown, can be plowed under in late spring or mid-summer, and if spring sown, in late summer or fall.

In feeding value, sweet clover pasture is comparable to alfalfa. It yields well when most permanent grass pastures are not providing much feed in mid-summer.

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Sweet clover requires good pasture management. Pasture lightly the first year after the plants have attained a height of 8 to 10 inches, and not closer than four inches for short, fine stemmed varieties, and six inches for large, coarse stemmed varieties.

For best results, sweet clover should be pastured close the second year. Animals can be turned onto it after the plants are six to eight inches high and it should be grazed enough to keep it at a uniform 12 to 16 inches, otherwise the sweet clover will become coarse and unpalatable. If it does get out of hand because of under-grazing it may be clipped with the sickle bar raised to not less than eight inches. Care must be exercised that cutting is above live buds on the lower stems and branches to assure satisfactory growth renewal.

Along with its advantages as a pasture crop, sweet clover does have some shortcomings:

1. It is not palatable to livestock at the first feeding. A liking for it must be developed but once accustomed to it, most animals will eat it readily.
2. Since sweet clover grows rapidly the second year, it is difficult to maintain balanced grazing.
3. Young pasture may cause scouring, making it necessary to give the stock dry feed.
4. Prevention of bloat is a problem in pasturing sweet clover, although there is less danger than from alfalfa and red clover.

Sweet clover is not a common hay crop. Well-cured first year hay, however, has a feeding value about equal to alfalfa. Excellent hay is often cut from the first year growth, but such clipping may reduce the next year's yield of forage. However, dairymen and others who need high quality hay for their animals may be willing to sacrifice maximum yields the second year to harvest fine stemmed, leafy hay the first year. The second year growth generally makes comparatively low quality hay. This is because it is difficult to cure the large succulent plants which are mostly coarse stems. Occasionally, second year hay causes a disease called "sweet clover poisoning" which causes internal bleeding.

Sweet clover is still the backbone of the bee industry. Not only does this plant yield an abundance of nectar easily gathered, but the honey derived from it is light colored and mild flavored.

The bulk of the sweet clover seed produced in this country comes from an area extending along the western edge of the corn belt from Texas to Canada. Seed production is concentrated in the eastern half of Oklahoma, Kansas, Nebraska, Dakotas and the western section of Iowa and Minnesota.

Maximum seed production is normally obtained from the entire growth of the second year. However, tall, rank varieties may require grazing or clipping not lower than 10 inches in early spring to reduce the plant height and make harvesting easier.

Since sweet clover seed shatters easily, every precaution should be taken to harvest at the proper stage of maturity. Highest yields of good quality seed have been obtained at Lincoln, Nebraska, by harvesting when 30 to 60 per cent of the seed pods are black or brown. Shattering is greatly reduced by cutting when the plants are damp from dew or rain.

No machine has proved entirely satisfactory for seed harvesting. However, an economical procedure that now is used quite extensively by seed growers is to windrow with a grain binder or windrower and thresh with a pick-up combine when cured.

Of the many species of sweet clover, only biennial white and biennial yellow are grown extensively in the Central and Northern regions of the United States. Common White is the most important variety which makes up about 80 per cent of all the sweet clover in the corn belt.

Common White is a large, white-blossomed, coarse variety, which under favorable conditions may attain a height of 30 inches the first year, and seven feet in the second year.

Sangamon is a new variety of biennial white flowered developed by the Illinois Station from late wild plants growing along the Sangamon River.

Grundy County, a small type of biennial white is of compara-

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tively uniform growth and maturity. It matures 10 days to two weeks earlier than Common White.

Of the biennial yellow species, Common Yellow is the predominant variety. It is smaller, finer stemmed, less upright than Common White, and matures 10 to 15 days earlier.

New varieties of biennial yellow have been recently introduced. Madrid is one which is rapidly gaining in popularity.

Hubam, the only important variety in the group of annual white flowered sweet clovers, grows two to seven feet high with numerous strong stems with comparatively few leaves.

Emerald, an entirely new type of white blossom annual is well adapted wherever Hubam is grown, and best adapted as a pasture and forage crop, where Hubam becomes coarse and rank.

In Rotation

There is no general rule on the best place for sweet clover in the rotation. There are varieties that fit into either short or long rotations. In the corn belt it should logically precede corn because of corn's ability to utilize the large quantities of plant food supplied by the clover.

If the soil is low in available nitrogen, there may be an advantage in having winter wheat or spring grains follow one or two crops of sweet clover. Where alfalfa is to be grown on land that is in a rundown condition, sweet clover may be planted first to pave the way.

Fortunately, sweet clover is comparatively free from serious diseases. However, such diseases as Mosic, Black-stem disease, Root-rot and Leaf Spot, do become severe in limited areas, especially in the most humid regions. There is no cure for infested fields other than to keep losses to a minimum by crop rotation.

The "sweet clover weevil," a little fellow about one-fifth of an inch in length, is the only insect known to cause heavy damage to sweet clover. In recent years the weevil has caused enough damage to discourage some farmers from growing the crop. The adult eats notches in the leaves, and if infestations are severe, they may eat the entire leaf. This can destroy the crop, particularly on first year seedings. Second year plants usually outgrow weevil injury, but the production is lowered. One weapon against the weevil is DDT dust. Another is early or late seedings so the plants are not young when the weevils are thickest. Seeding can be done as early as February or late as mid-June.

THE AUTHOR Born on a Michigan farm, Evart Vander Meulen directed the field crops division of the Upper Peninsula station after his graduation at Michigan State in 1939. While there he made the first Ladino plantings in the state. Formerly director of field seed research for the Corneli Seed Company, he is now in the field seed division of the Producer's Crop Improvement Association. His by-line on an article is a guarantee of thoroughness.

THE NEW LOOK IN HOGS

(Continued from page 81)

offspring superior to their purebred ancestors, the powerful breed associations might be very unhappy. And the scientists had a very strong hunch that would happen. In that case, Congress and the state legislatures might get stirred up, and the chief sponsors of tomorrow's pig live and work by the good will of the taxpayers' representatives. It was a long chance to take for the sake of a pig!

But that was not all. Immigration into this free land is virtually closed to anything on four legs. We haven't even any quotas. The explanation the law makers put out is that foreign animals are crawling with dangerous germs and such, but fear of their competition with our domestic beasts may possibly have had some influence on the framing of the laws. Yet if you want to produce the best that can be grown, legal bars may be a serious handicap. Science and politics do not always see eye to eye.

•So back in 1934 the first Landrace hogs to set foot in this country had to sneak in, so to speak, by the back door. They had to swelter down in the Virgin Islands while up in Washington the heads of bureaus pounded one another's desks and tried to decide their fate. That took six months, and the delay irked the scientists. But it also brought to light a serious weakness in the Landrace breed, one that would have been serious in the South.

Being blond, thin-skinned, used to a coolish climate and to being kept indoors, the Landrace hogs developed severe cases of sunburn under the torrid Virgin Islands sun. After all the trouble they had cost, the U.S.D.A. was of no mind to lose those hogs. So John Zeller, one of the Department's best experts, who had accompanied the shipment South, got busy.

Yet, had not volunteer help appeared from an unexpected source, Zeller would have been stumped. The Virgin Islands used to belong to Denmark. We had bought them in 1917 and a good many old Danish residents stayed on. The hogs stirred memories of home in the hearts of some of these Danish-Americans, none of whom had seen a Landrace on the hoof since childhood. It was a matter of honor with them to do every-

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thing they could to lessen the distress of those four-footed refugees from back home. Zeller says that without their help he never could have treated all those sunburn cases, or brought the hogs through their exile alive.

Finally the refugees reached Beltsville and a program of naturalization along scientific lines was marked out for them. That delicate skin, for example, would have to go. It would be best to turn the white, thin-skinned Dane into a red American—or a black one. So the Landrace was crossed with Duroc-Jerseys, Tamworths and Hampshires, each of which breeds had some of the characteristics the scientists wanted. Later an English breed known as Large Black was brought into the program.

A pair of black animals without spots may occasionally produce spotted offspring. In the language of the geneticist spotting is *recessive* to solid black. Recessive characteristics may pop out at inconvenient times to hamper the breeder, for they may control other characteristics far more important than mere color. By systematic inbreeding, geneticists now know how to bring such hidden traits to the surface. Once they have been so revealed, they can either be bred out, or fixed in the breed so they will be passed on to succeeding generations without variation. Thus, if the desired hidden genes are present, you can turn a white race into a black race, or a black race into a spotted one.

Geneticists are learning to bring about these uncanny changes with a minimum number of matings. At Beltsville you can follow the course of evolution of an entirely new race of animals on a fairly simple chart. Beginning with one white Landrace parent and a black one, it took the Beltsville men just eight generations to produce a strain of solid black hogs which possessed most of the desirable characteristics of the two parent breeds in a true breeding form.

The eighth generation actually has 81¼ per cent of Landrace genes, and only 18¾ per cent of some domestic black or red breed. Yet that generation has already turned into an entirely new race of hogs in which the color is firmly fixed.

And by the eighth generation far more important changes have taken place *inside* Mr. Hog. For example, the Beltsville experiments show that the rate at which a pig puts on weight is in part a heritable characteristic; to be exact, it is about 30 per cent heritable in any one generation. Over a number of generations, however, such characteristics, which used to be left to chance, can be altered to a surprising extent.

To date, the Beltsville experiments have resulted in eight new tailor-made strains of swine. Four of them are red, and four black. It is a mistake to think of these new strains as crossbreeds. They are, according to Dr. T. C. Byerly, chief of

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the Bureau of Animal Industry's Animal Husbandry Division, "mildly inbred closed lines of true breeding hogs developed from a cross-bred foundation." That is to say, they are to all intents and purposes eight new and as yet nameless breeds of "purebreds." If a farmer wanted to improve the carcass quality, thriftiness, and consistent performance of his farm herd, he would use them for breeding purposes exactly as he would use any purebred.

It will be some time, however, before any but a very few farmers and breeders get them. Boars from Beltsville are in use in swine breeding programs in 20 states where some of them will become the foundations of herds for local farm distribution. It is from these sources that they will eventually reach farmers and breeders.

It is hard to say as yet which of the eight Beltsville lines is the real champ. One line based on Landrace and Poland China parent stocks has averaged highest in carcass quality for several years. But another line based on the Landrace and the Chester White seems to be pushing for first place now. The line which may be of greatest interest to breeders in the next few years is one based on the Landrace and the Large Black. Some experts expect that this line, when crossed with domestic breeds, will show a higher rate of improvement than any other. Why? Simply because, being based on two parent stocks from abroad, it is more distantly related to our domestic hogs.

This hope is based on the principle of heterosis or "hybrid vigor" which has been so much discussed in recent years.

The principle of hybrid vigor has given a convincing demonstration in the Beltsville experiments. Each of the eight closed lines shows substantially better and more consistent performance than any of the parent stocks. But whenever one of the eight is crossed with another of the eight, a further improvement takes place. From weaning time, when the average weight is about 30 pounds, to the day they reach 225 pounds, the average rate of gain for the closed lines is 1.4 pounds per day. But for crosses *between* two lines the average daily gain is 1.65 pounds. This means crossbred pigs actually reach market weight two weeks earlier than purebreds!

Beltsville and the Regional Swine Breeding Laboratory, with headquarters at Ames, Iowa, can be considered the starting points for the advance of scientific swine breeding, but new hogs developed at Montana and Minnesota Experiment Stations in cooperation with the U.S.D.A. are far better known to American farmers. What is learned at Beltsville will affect breeding programs all over the country. Both the Montana and Minnesota hogs are in commercial production and are going to market from many Midwest farms. The Montana hog, first known as the "Hamprace," is a solid black hog now officially called

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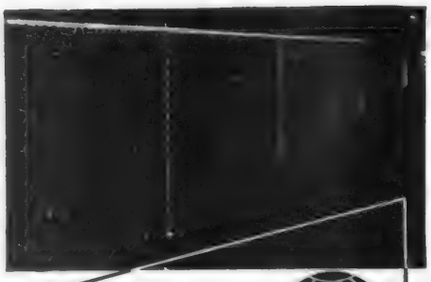

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Montana Number One, and is duly registered at the Inbred Livestock Registry Association, University Farm, St. Paul 1, Minn.

In 1936, three first generation American-born Landrace boars and 13 sows were shipped from Beltsville to the U. S. Range Livestock Experiment Station at Miles City, Montana. These were crossed with purebred unbelted Hampshires. Later seven more Landrace purebreds were shipped out for back-crossing. The result of this breeding program is an animal whose ancestral genes are 55 per cent Landrace and 45 per cent Hampshire. Though Montana Number One has a far smaller share of Landrace genes than the Beltsville lines, its performance compares favorably with theirs in many respects. Litters have averaged 10.6 pigs farrowed with 8.1 pigs weaned. Rate of gain from weaning to maturity has averaged better than 1.4 per day. Carcass quality has been high, the primal cuts averaging 47.1 per cent of live weight at market age.

Landrace genes appear in the famous Minnesota Number One, developed from parent stocks of Landrace and Tamworth purebreds. Here again, to quote Prof. L. M. Winters who developed the breed, the objective was "to stay as far away as possible from the types and breeds common in this country, on the theory that a line developed from such a foundation might be expected to cross well with the stock in this country. Farmers' reports verify this expectation."

Minnesota Number Two was developed later for two reasons. First, Prof. Winters wanted to make sure that the kind of breeding program which had succeeded once would succeed a second time, for he believes that in the future many good new lines can be developed on the foundation of existing breeds. Second, he wanted to develop a line that would cross well with Number One. For this purpose he chose Yorkshire and Poland China as the parent stocks.

Both these closed lines have crossed exceptionally well with each of five improved, inbred lines of Poland Chinas also developed at the Minnesota Experiment Station. Both the closed lines themselves and the crossbreds are unusually thrifty and rate far higher than the standard domestic breeds in carcass quality.

Perhaps two other new "pure breeds" have a place in this story. One is being developed from a foundation of Landrace and Berkshire parent stock by the University of Maryland cooperating with the U.S.D.A. This work is being done at Blakeford Farms, Queenstown, Md. Another is a white strain built on a cross between Landrace and Chester White at Pullman, Washington.

Where does the farmer fit into this picture? An example of how farmers can do so to get full benefit of the principle of

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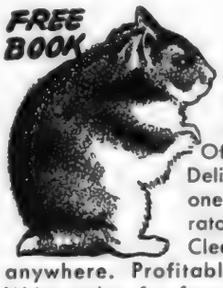

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"hybrid vigor" is Prof. Winters' suggestion of four ways in which farmers can use the various Minnesota lines. A similar program can be followed with the Montana hog.

1. The alternate use of Minnesota Number One and Number Two boars.

2. The alternate use of Minnesota Number One boars with any of the five inbred lines of Poland China hogs.

3. The rotation breeding of Minnesota Number One and Number Two with any of the five lines of Poland Chinas.

4. The use of the inbred boars of *any of these seven lines* on farm herds.

The FARM QUARTERLY will supply lists of breeders of Minnesota Number One and Number Two in your area.

Dr. T. C. Byerly, in charge of the Animal Husbandry Division at Beltsville, sounds a note of warning for all farmers interested in the streamlined pig of the future. He says, "Selective breeding will improve meat yield and reduce the lard yield, but remember that ANY pig will get too fat if you feed it long enough; market yours at 225 pounds or lighter, live weight."

THE AUTHOR—Alfred H. Sinks has made a living for 25 years interpreting science for the lay reader. His articles show thorough research and a profound respect for truth and fact. He has a farm in the famous Bucks County, Pennsylvania, area and he does his most entertaining writing on farm subjects.

FOOT ROT

(Continued from page 69)

in the country, for there's certainly plenty of air out there. However, those well ventilated country surroundings also include quite a few places where there isn't much air. How about mud and manure, which certainly meet specifications by furnishing damp and dark hiding places for fastidious bacteria? And how about the barnyard? And the rotten manure piles? And the old mud holes in the pasture? And those low places around the tanks? And the swamp pasture? And the edges of the brook?

After the germs get into the feet through a cut or scratch, nature teams up with them by providing comfortable quarters. Wounds have a tendency to scab over, thus sealing out air so that one important requirement is met. Once sealed over, the depths of a cut are pretty certain to be both dark and moist; another favorable break for necrophorus. As time goes on, pus formation helps to improve an already ideal set-up for the germs.

Now, as the text books say, let us take a tour with the foot rot germ, tracing it from the mud through to the time when it is causing a bad case of foot rot. We'll start with a happy, innocent old cow. In the interests of getting something to eat she goes sauntering around the landscape, and eventually steps on something that breaks the skin of her foot. It may be a sharp stone or a piece of glass or alfalfa stubble or any one of a dozen other things.

The injury smarts a little, but the cow generally keeps on with her browsing. Eventually she sticks the injured foot into filth. Maybe the injury occurs at a time when seasonal rains are making the whole farm a sea of mud. Or it may be the driest part of the summer when the cows hang around in the shade along the bank of the meadow creek. It may even happen in the winter when they stand all day in wet manure.

The chances are good that necrophorus germs are present in the mud or manure. Once smeared into the wound, the germs lose little time in setting up living quarters and raising large families.

That is the general belief as to how foot rot gets started. Now what to do about it?

No veterinarian just at present would be foolish enough to pick out any one treatment and recommend it as the best. This is because the necrophorus germ isn't particularly hard to kill when it can be reached. For another thing, practically every stockman and his neighbor has a pet treatment that is effective against foot rot in cattle. It may be chlorine or copper sulphate or carbolic acid or creosote or pine tar or any one of a hundred other products. It may or may not call for ingenius methods of bandaging the foot to keep it clean and dry. Deeper infections are a lot harder to take care of than those that are little more than skin deep. Deeper infections are not likely to be cured by any of the standard methods of treatment.

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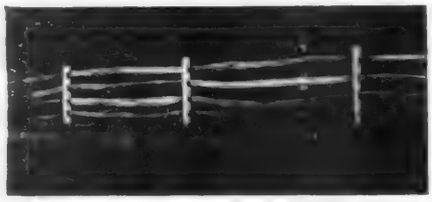

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Just imagine a colony of germs several million strong and multiplying by the second, doing business several inches deep in a foot. The old original injury may have long since healed over, and the infected area may be entirely walled in by perfectly healthy tissue. How in the world is anyone going to know just where the germs are located in that swollen foot? Even if they did, how to get into such a place with disinfectants to kill the trouble-makers is a poser for the average person. It isn't likely that soaking the foot in some kind of solution is going to be enough.

For such cases there are at present two effective methods of treatment. The first one consists of giving certain sulfa drugs by mouth or the sodium salts of such drugs by way of the jugular vein. In either case the sulfa is picked up by the blood stream and carried to all parts of the body. That means that the site of foot rot infection is reached, regardless of how deep it may be in the hoof. The drug then kills off the necrophorus germs, and there is no blind cutting and stabbing to get the area opened up for treatment.

The second and more drastic treatment consists of amputating one of the claws at the top of the hoof. When this is done the foot is really opened up so it can be cleaned out. Pus is drained off and air is allowed to get in so that conditions are no longer favorable for the growth of necrophorus germs. When kept bandaged the foot soon heals, and the animal gets along nicely with only one toe instead of the customary two. Aside from giving the foot a peculiar appearance, the cow is not injured.

Veterinarians are inclining more and more to the use of sodium sulfapyridine given by vein. They like it because it is easier than wrestling with an animal, and maybe getting a lump on the head while monkeying around with a sore foot. The owner likes it for a number of reasons.

First of all, it works in about 98% of the cases, which is a rare average for any kind of treatment for any kind of disease. Results are generally evident in 24 hours as shown by less lameness and general improvement of the treated animal. Then, too, there is nothing for the owner to do other than help hold the animal while the sulfapyridine solution runs into the vein. No casting of cows that may be heavy with calf, no cutting or trimming of feet, no daily soaking or doctoring, no bandages to put on or take off—it's quite an improvement over the old ways of treating foot rot. As a general rule only one treatment is required. This consists of one pint of a 12% sodium sulfapyridine solution. In exceptionally bad cases the treatment may have to be repeated a week or so later, but second shots are seldom needed. The average cost for one treatment is about six dollars depending on the distance the vet must travel.

Prevention

Since wounds are necessary to start foot rot trouble, common sense says to start out by doing away with all objects on the

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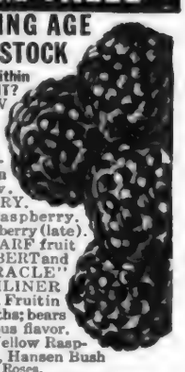

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premises that are capable of causing foot injuries. There isn't much excuse for wire, broken bottles, pieces of tin, and other assorted junk being scattered around in the pasture or cow lot. That goes too for sharp stones and cinders which are sometimes unloaded in cowpaths and barnyards to fill mud holes.

Well, suppose we've been good owners who have done our best to prevent foot injuries. With all this done, there still is this matter of mud. In spite of our best efforts, there are still going to be a few foot injuries around the place. A prevention program calls for doing something about necrophorus hangouts.

The best of farmers can't do much about the weather, so there will always be times in the spring and fall when the average farm will be all mud. However, the dirtiest of all places at such times is the barnyard, and we can do something about that.

The most satisfactory barnyard, of course, is one of concrete. However, most of us will never be able to have one of that kind, so we'll have to figure out something to do that will give us an acceptable substitute. A common and practical measure consists of draining the yard. It doesn't have to be an elaborate engineering project with tiling and all the trimmings. An entirely satisfactory drainage system may be nothing more than a wide shallow ditch sloping off in the right direction.

If the lay of the land prevents drainage, there is still the old practice of hauling in materials to cover up the mud and so build a dry surface. The use of sharp stones or cinders for this purpose is not recommended. The best choice for the job, unless you can put in concrete, is sand and smooth creek gravel.

With the barnyard taken care of, there are still those pasture mud holes to consider. Usually there is one of two things to do with such places. First of all, it may be possible to drain them. If the spot is too low or the presence of a spring prevents drainage, there is always the possibility of fencing them off so cattle can't tramp through them. We realize that there sometimes isn't much to be done when a whole bottom pasture of marsh land is involved. However, a little figuring will often show how to get rid of a lot of mud that may otherwise cause foot rot in cattle and other troubles, since mud can also support other bacteria which cause mastitis and a variety of infections.

THE AUTHOR—Dr. Jack Bailey needs no introduction to *Farm Quarterly* readers, for he has been with the magazine as a practical, authoritative author on the ills of farm stock since the first issue. Cows and their health are his special interest, since he was born and raised on a Wisconsin dairy farm, and is now ministering to some of the fine herds in that state.

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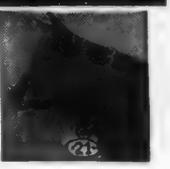

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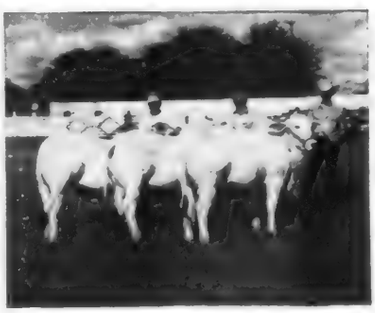

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MARCH OF THE SPITTLE BUG

(Continued from page 53)

farmers discover the insect and identify him in time to apply the best control measures, (2) if they do decide there is a need for action they seldom have the necessary spraying and dusting equipment.

The first step is to decide whether or not the field should be sprayed or dusted. Dr. Parks says that if there is spittle on every third clover or alfalfa plant it is time to go into action. He recommends the use of benzene hexachloride at the immature stage when the insects are encased in spittle. DDT will not kill the young efficiently. Benzene hexachloride, commonly called BHC, should be applied early, preferably during the first two weeks of May in Ohio, and slightly later in Michigan. The lapse of time between spraying or dusting and the harvesting of the forage crop will give the chemical time to lose its potency. This is important since the Pure Food & Drug Administration frowns on the presence of BHC in foods and feed, and it can show up in cooked foods or even milk when applied too soon before harvest. Early application is especially important for the dairy farmer.

BHC can be applied either as a dust or as a liquid spray. If dust is used the field should be treated with 25 pounds to the acre of BHC carrying 0.5 per cent gamma isomer, either with a power duster or an airplane.

Low pressure sprayers have met with little success in applying BHC spray. The sprayer should apply 150 gallons to the acre at 400 to 500 pounds pressure, which will drive the spray downward into the plants. In mixing the spray use one and a half pounds of BHC powder carrying 6 per cent gamma isomer for each 100 gallons of water.

The following rules should guide the farmer in his use of the chemical: (1) Don't apply to berries within two weeks of the first picking. (2) Don't use on pastures. (3) Don't apply to hay crops within three weeks of cutting. (4) Don't breathe the dust more than necessary and use care in handling either dust or spray.

Benzene hexachloride should not be used for spittle bug after the first of June. At that time the bugs are beginning to mature, and during most of June part of them will be adults and part of them will be nymphs. During this period the BHC will kill only those which still haven't graduated to the adult class.

One other chemical recommended by scientists for the control of spittle bug in place of BHC is toxaphene, or chlorinated camphene, applied at the rate of one and a half quarts per acre after the spittle masses are seen on 20 per cent or more of the plants. This is the chemical suggested for the job by the University of Wisconsin. It should not be applied to crops that will be fed to stock.

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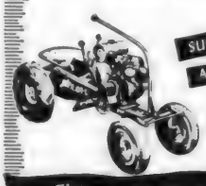

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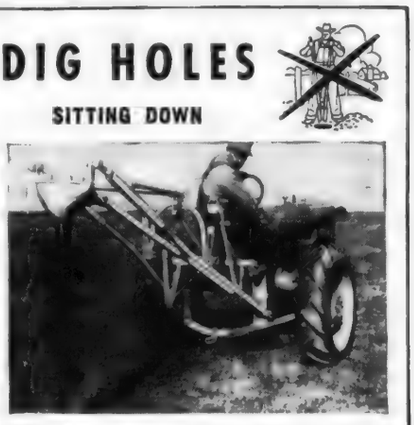

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To Kill The Adults

The adult spittle bug, no longer protected by the spittle, can be killed with DDT. Dr. Parks says a three per cent dust spread at the rate of 30 pounds to the acre will do the job. The safety rule with DDT is that the dust should not be applied to a crop less than three weeks before it is harvested. With all the questions presently being asked about the possible damage DDT can do to food for human consumption, and in view of the feelings of the Pure Food and Drug Administration on DDT, the three weeks time limit should never be cut short.

One good machine for applying DDT or BHC dust to meadow crops is an airplane. Several Ohio farmers tried the aerial attack method during the past year and pronounced it successful. M. I. Kern of Champaign County had a 22 acre alfalfa field that he thought he was going to lose to the spittle bug until he had an airplane come in to treat it. Kern hired the Van Wert Aerial Dusting Service in Van Wert, Ohio. That was on May 12 and the spittle bugs were still in the spittle. This called for BHC. The field was dusted with 500 pounds of the chemical which sealed the fate of the bug. Dr. Parks went to see the field the following day and found that only those spittle masses in the top half of the plants had disappeared. A few hours later, however, there was a rain and the dust washed down to the lower parts of the plants and killed the remainder of the bugs. After the spraying the field was clear of spittle bugs, but near the Kern's farm house, where the dust hadn't fallen, the bug was still holding out in numbers.

The cost of airplane spraying for DDT dust or BHC is usually under $2.25 an acre which includes the price of the chemical. Standard price for the airplane's services is four cents a pound for spreading the dust.

Aerial Attack

The Van Wert Aerial Dusting Service, which dusted Kern's alfalfa field, has been dusting crops with planes for three years. Norm McGee, who manages the business, will send his planes any place in Ohio, Indiana, Wisconsin or Michigan to do a job. McGee dusted a field in southern Ohio where there was a spittle bug infestation in an alfalfa-clover field. He flew at about 75 miles an hour and kept the wheels just far enough off the ground to stay airborne. When he landed after finishing the job the farmer asked him what was the smallest field he would attempt to dust. "The field," McGee said, "has to be longer than the airplane. These planes will go right down to the edge of the field and climb a 50 foot tree to get out." McGee will dust a field as small as two acres. The plane and pilot can cover in a few minutes what it would take a regular spraying rig all day to do.

The procedure for the farmer is simple. He notices that the spittle bugs, grass-

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hoppers, or leafhoppers are getting so thick in his fields that there's no time to waste. He goes to the phone and calls one of the dusting services now in the business. The following morning, probably shortly after daylight, a plane lands in his field, loads up with insecticide and starts swooping back and forth across the field. In a few minutes the dust is down, the plane climbs, dips its wings and leaves the bugs to their fate. The farmer can still get a day's work done.

Airplane dusting is best done in the early morning or late evening when the air is quiet. Working at these two times one plane can spread from 5,000 to 10,000 pounds of dust a day. It is best for farmers in a spittle bug infested area to gang up and order the aerial dusting service.

With the help of airplanes, modern chemicals and constant research the march of the spittle bug can become his funeral procession.

CHINCHILLAS

(Continued from page 56)

young, and will insure a better herd.

When pairing up, allow them plenty of room to get acquainted. Place the prospective partners on the floor, or in a special mating pen, at least 6′ x 8′. Place a nest box at each end of the enclosure. Then leave them alone. Sometimes they will make up immediately. If they are not contentedly sharing the same nest box within three days introduce another male to the female. Chinchillas are monogamous. Once a mate is chosen, it's for keeps.

At the end of the 111 day gestation period the female will bear from one to four off-spring, fully furred, open-eyed, and with their teeth already in place. The female will average two litters a year.

Chinchilla records should be kept in three parts, a pen card, office record, and a daily log. The pen card attached to the pen, should show the condition of the female at time of littering, whether she successfully nursed and raised her babies, what type of mother she was, condition at time of weaning, and quality of youngsters produced.

The office record card should show the date of birth of each animal, its past and present physical condition, when it was paired and to what mate, breeding and littering data, and its pen location.

In addition to the pen card and the record card, a daily log should be kept. This should show births, deaths, pairings breedings, moves, trades, feeding schedule, temperature readings, sick animals, special treatment given, etc.

Chinchilla breeders grade young chinchillas on size and vitality. A strong lively one is rated "A" for vitality; one less so is rated "B", and a weak one is rated "C". Sizes are rated in the same manner. Large, good looking youngsters rate an "A" for size, and so on down the line.

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A small electrical heating element must be placed in or beneath the nest box during littering time. A satisfactory heating element may be purchased at most hardware or electrical appliance stores. Either a 15-watt or 25-watt element is recommended, depending on local climatic conditions.

It is best to turn on the heat a few days before the litter is due in case the litter should arrive early. Maintain the temperature as close to 70° as possible, regardless of the season, and leave the heat on for a couple of weeks after littering. If the weather is extremely cold or damp give the youngsters heat for a few extra days.

In some cases the female chinchilla's milk doesn't come in when her young are first born and they must be fed artificially until milk flows. For supplemental feeding, use canned milk, diluted with hot water. Mix 40 per cent milk to 60 per cent water and feed lukewarm with a medicine dropper in small, but frequent, servings. As the youngsters grow older increase their feed and lengthen the intervals between meals.

Young chinchillas begin to eat soft foods when only a few days old. Keep a mixture of wheat germ and red bran before them. At three weeks of age young chinchillas will be eating from their mother's feed bowl.

Sometimes a young chinchilla will bite the mother's nipples and she will fight it away. The remedy is a dental emery disk used on the four front teeth to slightly dull them.

The Housing Problem

Chinchillas have been raised successfully in every type of climate. For newcomers, starting on a small scale, the basement, attic, or any small building may be converted into chinchilla quarters.

If possible, the sun should shine on all parts of the pens at some time during the day. The sides and roof should be properly insulated against both heat and cold, and ventilation should be arranged to permit plenty of fresh air at all times, but without drafts. Walls and floors must be kept dry.

Types of units and pens vary according to local climatic conditions. On the Pacific Coast, the open type unit is generally used. In harsher climates the closed type is preferable. For the open type unit, celloglass screening makes an ideal siding. The screenings may be raised during the sunny, daylight hours, but closed at night, and during damp, cold weather.

Material for individual pens, including nest boxes, should not amount to over $15 each.

In the event that you lack time or patience to construct your own pens, Mr. L. J. Chudley of 2360 Midvale Ave., Los Angeles 25, California, will build them for you. Chudley builds an excellent 36″ x 30″ x 24″ collapsible pen with a removable bottom, nest box and refuge box included, for $30, plus freight.

Pens should be constructed with wire sides, top and bottom. Use three-eighths inch mesh hardware cloth for the flooring and one-half inch mesh for the rest of the pen. As the chinchilla is a good gnawer, the wiring should be attached to the inside of the wooden frame.

The nest box should not be a dungeon, for the chinchilla thrives on fresh air. The main requisite is that it provide refuge from light, daylight disturbances, and weather extremes.

Nest boxes are quite inexpensive. The size in general use is approximately 11″ x 16″, with a 16″ depth. The entrance should be lined with metal to prevent damage by gnawing.

The outside of each nest box should contain an electrical connection for the heating element used during littering time.

Temperature

During the summer months care must be taken to keep temperature below 90°F. Methods of combatting high temperature are by ventilation or air-conditioning.

Although low temperatures improve the fur of the chinchilla, it is advisable to keep the temperature above freezing. This can be accomplished by installing a heating system using a thermostat control. Animals breed better if the winter temperature is maintained between 40° and 60°.

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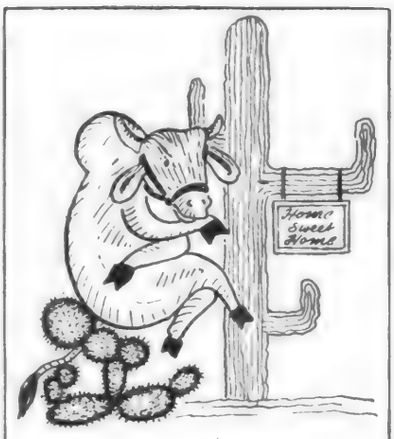

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A refuge box is a place of refuge when one animal becomes too rough with another. Since what little scrapping chinchillas do is done by leaping, the refuge box is very effective.

These boxes are inexpensive and easily made. Use 1" x 12" boards cut in one foot lengths with a 3" board on each of two sides, leaving a 3" space underneath the board where one animal may find refuge from the other. Do not build your boxes with more than the recommended clearance or they will be worthless.

Although the fastidious chinchilla is not a water bather, he is fond of his sand bath and not fussy about the arrangements. Any round pan of about four inches in depth and large enough for him to roll in will do. The pan should be half-filled with nine parts finely-screened, fresh water washed white sand, and one part unscented talc. Some breeders prefer Fuller's Earth to the sand and talc mixture. Place pans in the pens in the early morning for at least an hour.

In each pen, an inexpensive exercise wheel will help keep the animals happy and healthy. They enjoy an occasional fast run.

It is a good idea to have a small piece of red brick in each pen. Your animals will make good use of it to keep their teeth in shape. A block of wood will give them a chance to gnaw without damaging their pens.

A salt spool is another essential. If nailed or wired, the spools will soon become discolored by rust, but the iron is good for the animals.

A beginner will gain a wealth of information by requesting a sample copy of "The National Chinchilla Breeder," published monthly by the National Chinchilla Breeders Association, Salt Lake City, Utah. This publication covers every phase of the industry and will tell you where to obtain everything from water bottles to tattooing equipment.

Do Many Fail?

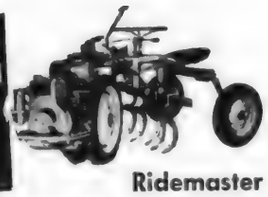
Failure in this business is rare. Barring accidents, about the only way one could fail is by carelessness, improper sanitation, or by sheer neglect of the animals. But, this holds true with any livestock.

Sale Of The Pelts

As chinchilla ranching is still on a breeding basis, there is at this time no established market for the pelts. However, furriers who are acquainted with chinchilla fur are usually glad to get them when obtainable. Pelts usually become primes in January, February, or March. and prime pelts of good quality should bring between $75 and $150 each.

Chinchilla breeding, like raising corn, Herefords, turkeys, or playing poker has its risks and shortcomings. It is not just a matter of investing your life savings and sitting back while the dollars roll in. A Salt Lake City chinchilla breeder says,

One of these **BOLENS-HUSKI TRACTORS Exactly Suits Your Purpose**



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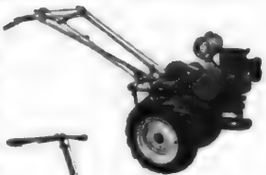

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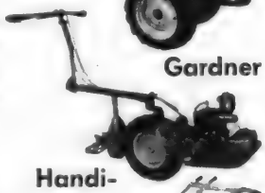
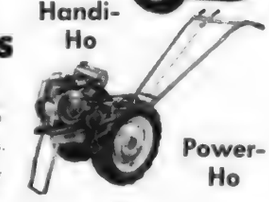


Handi-Ho



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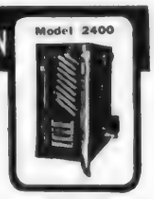

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"Raising chinchillas isn't a get-rich-quick business." He adds that the fact that they're easy to raise doesn't mean there isn't any work connected with them. Like any other animal they require the proper care which in this case means food, water, good clean pens and daily attention. They'll keep you home every day of the year to feed and water as surely as chickens will, but if you like small stock you'll probably like chinchillas, and if you like them you'll probably make money with them

THE AUTHOR—Glendon R. Herdman is a native of southern California. He has written for national magazines, and is now putting the finishing touches on a book on chinchillas, which grew out of his research for the chinchilla article in this issue of *Farm Quarterly*. He has a couple of other books on the fire and occasionally gets time to visit his alfalfa farm in Antelope Valley.

FARM THAT PASTURE BUILT

(Continued from page 77)

rotation, the land is plowed, seeded and the crops harvested according to the needs of the whole rotation.

There are other tricks in the pasture trade which Davis never had to use but which he could have employed had the need arisen. There are ways of getting emergency pasture for spring, summer or fall when the regular pasture acreage is likely to be short. A farmer planning a pasture program must look ahead to the following year, for as Dodd says, "The time to plan this year's pasture was last year."

The farmer who has a good rotation. or permanent grass sod, and wants to speed up his spring pasture can apply 40 to 60 pounds of nitrogen to the acre. The nitrogen in the form of a high nitrogen content fertilizer can be applied in the fall or at any time during an open winter up to April 15th. The nitrogen should give 10 days to two weeks earlier pasture in the spring. If the sod is poor use a complete fertilizer, for instance a 10-6-4 which will give a combination of earlier pasture and a thickening of the mat.

If a look ahead indicates that there will be a shortage of pasture during the mid-summer period there are crops that can fill this gap too. Sudan grass is one of the best and it can be any one of three varieties, Common, Sweet, or Tift. Tift is usually considered the best of the three. It can be seeded during the preceding autumn and the field treated with 500 pounds of 8-8-8 nitrogen high, fertilizer. Other emergency crops for the critical summer months are rye grass, barley, or some other small grain.

The standard late fall pasture is blue grass such as that which Davis feeds, or meadow mixtures on fields which will be torn up the following spring to fit in the rotation. There are also emergency crops to replace these when the need arises. Rye grass seeded the last half of August makes a lot of good pasture during the same

First Choice

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Among Farmers Who Know
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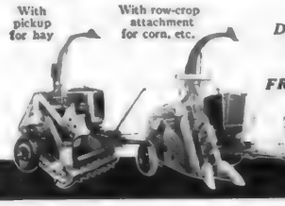

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"The Atomic Bomb for Weeds and Pests"

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Spray boom with double boomjet nozzle is now standard equipment and produces spray pattern 16 ft. wide.

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Attachments extra.
Plus Freight
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This between-the-row garden tractor is like having a hired man with six pairs of hands . . . becomes an easy-going power mower . . . power snow shovel . . . cuts wood . . . sprays . . . hauls, and does many other chores. Cultivate the garden after the crops grow tall—do late garden tasks delayed by rains. Grow more by planting closer rows. Its one wheel is unequalled for fast, safe cultivation such as tobacco. Turns easily at row end. See your dealer or write for folder.

Cultivating
Sickle Bar
Cutting Grass

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autumn. It should be seeded 20 pounds to the acre. If it is the perennial variety it will also provide some early spring pasture. Rye or barley are also used for fall pasture. Other possibilities are orchard or brome grass.

Since Davis took over the farm in 1930 he has built the house in which his family lives. He has also built three barns and four chicken houses, a silo and some smaller buildings. He has brought electricity to his barnyard and uses it to power the 45 electric motors which help him with chores. He just finished building a new laying house to house his 1,500 White Leghorn hens which he keeps because he believes in some diversification of farm enterprises.

His land has all been improved now and Davis feels that his big job is to keep it in good production and harvest the crops of grass it grows. Last year he sold 45 head of purebred Hereford yearlings, most of them for breeding stock. He is thinking of also adding some sheep, since he now has the feed and sheep are a favorite of his. Last year he wintered his cattle on hay grown on his own farm and sold 60 tons besides.

The Davis farm is at the stage now that Davis visualized back in 1930 when he took over 120 acres of gullied fields. "But," says Davis, "I thought maybe the work would be less as I went along. There's more work to do now than there ever was. Pasture improvement may be the highway to success, but it's no easy street."

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COVERED BRIDGES

(Continued from page 67)

The covered bridge was not designed as a thing of beauty, and it seldom was. Taken out of its pleasant rural surroundings it was a drab structure, functional and weather beaten. Generally the architecture varied little. Different engineers used different types of trusses and different designs for the portals, but outwardly the bridges looked much alike. Some had windows, some didn't. While some were single lane tunnels, others were double-barreled to permit two way traffic. Occasionally one was built with a sidewalk along one side for the convenience of pedestrians.

One covered bridge that varied from the usual pattern was the old Y Bridge at Zanesville, Ohio. There at the confluence of the Licking and Muskingum Rivers the city fathers wanted a bridge that would connect three early settlements. The bridge they designed had three entrances, dividing in mid-stream.

The longest covered bridge in the world spanned the Susquehanna River between Columbia and Wrightsville, Pennsylvania. It was 5,620 feet, a little more than a mile in length.

As roads are relocated and widened the old covered bridges are giving way

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Gorman-Rupp Pumps are made in all sizes from the Handy and Midget up to irrigation pumps delivering 1000 GPM at 100 lbs. pressure.

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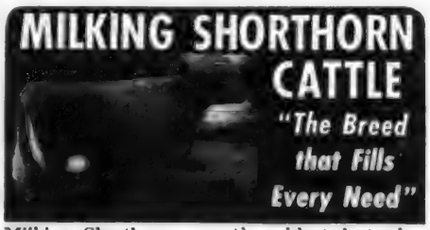

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to steel and concrete structures. Covered bridge enthusiasts have banded together to study the antique structures and to preserve a few typical ones for the benefit of coming generations. A periodical publication called *Covered Bridge Topics* keeps members informed.

The timbers built into covered bridges were generally high grade lumber. When old bridges were torn down the lumber went into some other line of work. Many a barn has beams that once supported covered bridges. In Pennsylvania a match factory purchased and dismantled an old bridge, planning to turn it into match sticks. The timbers were so hard they couldn't be used.

Double barreled bridges permit two way traffic.

Many covered bridges are still used by the towns that own them as storage places for city fire and maintenance equipment.

There is still occasional speculation about the reason for building a roof on a timber bridge. One theory was that they kept snow from the bridge, but there are still some bridges where local farmers are paid each year to haul snow for the floor to facilitate the passing of sleighs. The real reason is simple; the roof protects the wood from moisture and decay. One old Maine farmer summed up the question of why they covered bridges with, "It was for the same reason women wore petticoats—to protect their underpinning."

The future of the covered bridge is bleak. Although they grew up with the country, the country is now growing away from them. The covered bridge may successfully withstand the weather, but not the new highway engineers. They are perhaps not quite as permanent as Professor E. D. Sanborn of Dartmouth led his audience to believe in a public address which commemorated the completion of the Ledyard Bridge over the Connecticut River in 1859. "Let no vandal hand be raised to deface this noble structure," the Professor said, "or injure one fiber of its timbers. Palsied be the arm that shall aid in its demolition, and speechless be the tongue that would plead for its disfranchisement." The Ledyard Bridge stood for 75 years, and if the workers who finally tore it down in 1934 were visited by the professor's curse, the newspapers of the day failed to record it.

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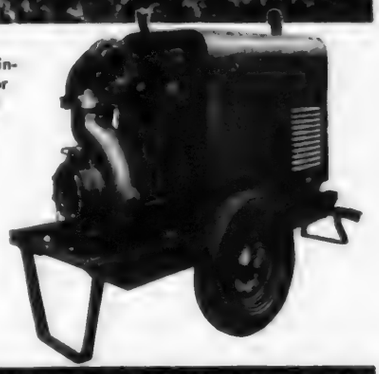
These pumps embody the latest features for modern sprinkler irrigation. Marlows are new—designed especially for today's new pressure and capacity requirements. They will supply water dependably and are thrifty and virtually maintenance-free in operation. Equipped with engines that have the latest safety features.

Marlow Centrifugal Irrigation Pumps are available in 12 models, sizes 2- to 6-inch, including two models designed specifically for the new 2- and 3-acre sprinklers. Capacities 50 to 1500 GPM; pressures 30 to 200 PSI. Gasoline and Diesel engine driven. Skid mounted or with steel wheels or rubber tires.

Write for irrigation facts and full information.



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With Buckner sprinklers, you have low cost Water WHERE you want it WHEN you want it.

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FAIRWEATHER RAIN

(Continued from page 73)

eral pipes of four inch aluminum were run from the main at right angles, one toward either edge of the field. Each of the laterals was fitted with seven low pressure revolving sprinklers capable of delivering 25 gallons of water per minute. The 14 sprinklers can deliver a total of 350 gallons per minute.

Oldfield left with Borg a complete diagram to guide him in moving his lateral pipes and gave him a layout for making new sets to water the entire field. The main line was to be left in place unless the entire system was moved to another field. "By running the system day and night," said Oldfield, "he could irrigate two 20 acre fields with one system."

When the price for the system was figured up it came to $2,244.00. "We usually find," says Oldfield, "that the cost for this type of system runs about a hundred dollars an acre." Broken down, the costs for the various parts of the system were: pump, $630.00; pipe $1,399.00; sprinklers, $134.00; plugs for unused outlets, $28.50; $15.40 for 14 risers to lift the nozzles a foot and a half above the crops; and a pump line adapter, $6.60.

There is no rule on how large an irrigation system can be and still be profitable for the farmer. It can be any size that the situation calls for since the law of diminishing returns doesn't limit its size.

The soils that give best results from irrigation are well drained, easy to work and neither heavy, nor sticky and coarse. Heavy clay soils present a more difficult job in irrigation. Clays do not absorb the water at the relatively rapid rates that sandy or loam soils take it in. On clay soils the water must be put down slower, which means that the irrigation requires more time and consequently more labor. The water should not be applied to any soil so rapidly that it puddles or runs off.

Once the irrigation system is ready to go to work the next question is how much water should be applied to the crops. The answer depends on the crop, the weather, and the nature of the soil. Truck crops and pastures are shallow rooted crops and get their moisture close to the surface. Their moisture comes from the upper 12 to 18 inches of soil. Such crops as alfalfa, potatoes, and fruit trees get their water from the upper two to four feet of soil. Shallow rooted crops require frequent light sprinklings, while the deep rooted crops should get heavier applications less frequently. As a rule of thumb, truck crops and other shallow rooted plants require one inch of water per week from either natural rainfall or supplemental irrigation. Pastures need two to three inches every 10 days. Alfalfa and other deep rooted hay crops should get one heavy application of four to six inches between cuttings.

IRRIGATE WITH A Moulton PORTABLE IRRIGATION SYSTEM

Most profitable method of controlled rainfall when, where you need it most!

MOULTON QUICK COUPLER

"The Heart of the System"

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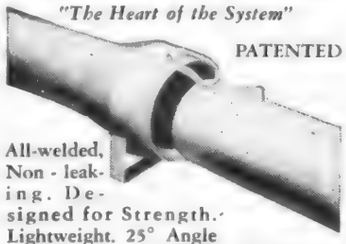

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Moulton Systems are engineered to fit any size or shape field, hilly, or flat. Supplied with lightweight aluminum or steel pipes. They provide: Better Distribution . . . Lower Pumping Costs . . . Greater Portability . . . More Flexible Joints . . . Reinforced for Years of Dependable Service. Many Users Pay for System out of Extra Profits the First Year!

FREE! A card will bring you complete information.

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Write for free information explaining how to make up to $3,000 in your own backyard. *Address:*

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Dept. 145 **Columbus, Kansas**

Farmers use a simple, general rule to determine when to irrigate. They dig down about six inches and grab a handful of soil. If it sticks together the soil is moist enough. If it crumbles, it is time to add more water. Michigan State College is working out a method of burying manganese blocks in the soil and later digging them up to determine how much water they have absorbed from the soil.

Crops should never be allowed to reach the wilting stage before they are given a drink from the irrigation system, and irrigation should be used as a prevention rather than a cure. Some farmers irrigate after light rains to be sure that enough water gets into the soil to penetrate the

root zones and keep the roots from growing toward the surface.

Odd Jobs For Water

F. W. Peikert of Michigan State College has delved into the possibilities of applying liquid fertilizer through the irrigation system. His work has demonstrated the value of applying nitrogen in midseason as the crops need it. Potash, too, can be applied as a liquid, but the plan is not sound for phosphorus.

The times of the liquid nitrogen applications and the rate of application vary with the soil types and the crops being treated. Some truck gardeners have had good results from applying eight pounds of nitrogen to the acre weekly during the six week period when the crops are growing most rapidly.

Liquid fertilizer is usually routed through the irrigation pump by drawing it in through the intake side of the pump during the course of a regular irrigation. A fitting is attached to the pump and the dissolved fertilizer drawn from a barrel. The fertilizer should run through the pump, mix with the water stream and be sprinkled on the field in about 10 to 15 minutes. The water is then run an additional 15 minutes to wash all the fertilizer off the plants and onto the ground where it can go to work. The opposite is true of spraying with the irrigation system. The spray is run through the system last so it will not be washed from the plants.

Another part time job for irrigation water is the prevention of frost damage to high value crops. On late spring evenings if the thermometer takes a contrary drop the water can be turned on and left running until the frost danger is past.

William Gehring, who farms 5,800 acres of muck land near Rensselaer, is the country's leader among users of portable overhead irrigation. Gehring, who grows mint and potatoes, found that his investment in land and equipment was too big to take chances with the rain. Now he can irrigate any of his cultivated land, and he owns enough land to control the water rights he needs to protect his investment in crops. His big operation indicates that there is no law of diminishing returns in irrigation.

Irrigation distributors foresee a bright future. During the past summer they reported from all parts of the country that the demand for portable sprinkler irrigation systems was at an all time high. One Midwest distributor reported that his crew had been working seven days a week and often late at night to keep ahead of the orders. A drought brings sudden increased demand for pipes, pumps and sprinklers. But even with extra heavy spring rains in much of Colorado, Nebraska, Kansas, the Dakotas and surrounding states, a distributor in that section says, "We are shipping more sprinkler systems than ever before." It appears that the ancient Babylonians knew what they were doing when they took water to their arid deserts.

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FREE BOOK OF ANSWERS TO

Portable Sprinkler

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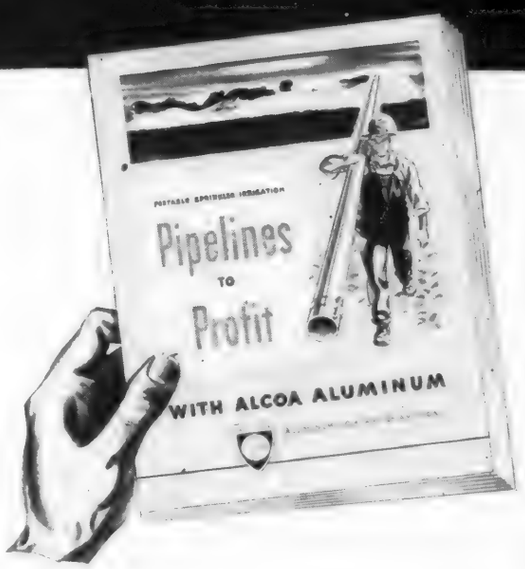

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These, and many other questions are answered in this 32-page, 9 x 12" book, "Portable Sprinkler Pipelines to Profit". It is FREE. To get your copy, fill out and mail this coupon today.

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YOU GET
Greater yields
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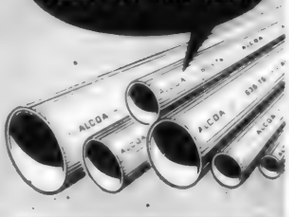

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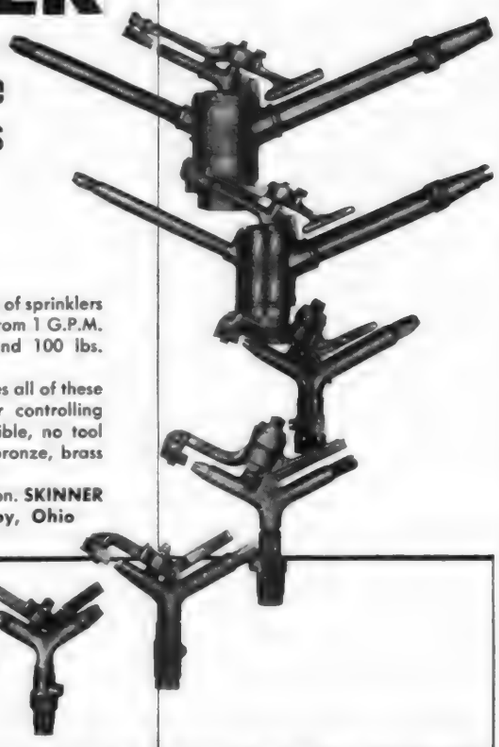
the most complete line of sprinklers for lightweight portable pipe



SKINNER offers the most complete line of sprinklers on the market today, ranging in size from 1 G.P.M. at 5 lbs. pressure to 410 G.P.M. and 100 lbs. pressure.

Each SKINNER sprinkler incorporates all of these outstanding features: adjustment for controlling rotation, working parts easily accessible, no tool required when making adjustments, bronze, brass and stainless steel parts throughout.

Write today for complete information. **SKINNER Irrigation Co., 200 Canal St., Troy, Ohio**

"Pioneer and leader in irrigation for nearly a half century"

MOTHER NATURE IS FICKLE..

Gorman-Rupp Irrigation Pumps Are Not

They Never Fail to Deliver

When rains fail, crops fail. A Gorman-Rupp Irrigation Pump assures WATER WHEN NEEDED with least fuel expenditure.

Gorman-Rupp pumps run day after day, entirely trouble-free.

Available in various sizes—ratings from 100 GPM at 70 lbs. pressure to 1100 GPM at 130 lbs. or 3000 GPM at 20 lbs.* They will give the best performance for the least cost of installation, operation and maintenance. A dependable pump.

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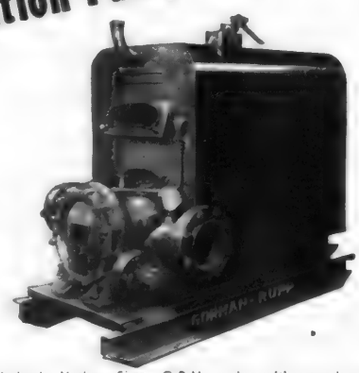

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Weighs only 20 pounds . . . delivers 8 GPM at 40 lbs. pressure (more at lower lifts) . . . lifts up to 25 ft. Electric motor driven. An all around pump for farm and home use.

Made in Various Sizes. G.P.M. varies with pounds pressure, continuous operation ranges follow. (Maximum performance approximately 15% greater.)

Model	HP	Capacity-Pressure Range									
6201	7	50	gpm	@	75	lbs.—	150	gpm	@	40	lbs.
5306	11	150	"	@	65	" —	300	"	@	35	"
5303	20	225	"	@	85	" —	400	"	@	40	"
5410	40	300	"	@	75	" —	600	"	@	50	"
5404	50	550	"	@	120	" —	775	"	@	75	"
5503	75	625	"	@	120	" —1250		"	@	60	"
5507	90	800	"	@	120	" —1400		"	@	60	"
5" Fig. 701	125	1100	"	@	130	" —1400		"	@	110	"
*61001	40	1200	"	@	55	ft. —3000		"	@	35	ft.

*Low pressure, big capacity for open ditch irrigation.

THE Gorman & Rupp Pumps — **GORMAN-RUPP COMPANY**

MANSFIELD, OHIO

ZADRUGA

(Continued from page 31)

dual-purpose animal. Many Yugoslav farmers have never seen a Jersey or a Guernsey, nor any of the beef breeds such as the Whiteface and the Angus. The Simmental is a hefty animal, which compares very closely in size, production, and beef qualities to the Milking Shorthorn.

Many of the collectives are carrying on a cross-breeding program in hogs, crossing the Berkshire and the Yorkshire breeds with the native breed known as the Mongol. The Mongol, to Western eyes, is an odd animal. It has a long curly coat more like wool than bristles and ranges in color from a dirty white to light brown; its beady little eyes do not inspire trust. It is a lard hog and all cross-breeding is aimed to develop a lard hog, since the country is woefully short of fats. An Asiatic sheep, with some French and English mixtures, is common.

The funneling off of grain for bread has cut down stock feeding and created a meat shortage. Although every farm has a few hens, poultry and egg production on a commercial basis is almost unknown. The horses are small and wirey, in breed a mixture of Arab and Cossack horses of the Steppes. In America we would not think of them as draft horses; none are as large as a good, heavy saddle horse. A few heavy Percherons which the Yugoslavs received in UNRRA were not popular. "They were too slow, and ate too much," was the verdict. "They weren't well broken," one farmer said. He agreed that the trouble might have been the horse's inability to learn Slavic.

Crops

Today the production in Njegus collective of 12,000 acres is considerably more than what it was under the old time methods. Consolidation in large units of hundreds of small plots, mechanization, and more commercial fertilizer has increased yields. Under the old methods the light horses and primitive plows did not permit plowing more than four to six inches deep, and during centuries of this shallow plowing a hard pan had developed which limited yields.

Deep plowing with tractors tapped new stores of plant food, aerated the soil, and crops increased. Chief crops are potatoes, Indian corn, wheat, sugar beets, cow peas, alfalfa, and some tobacco, hemp and barley. The yields are far below what is found on the average in the Middle West. During the war years intensive cultivation without fertilizer and little manure bled still more a depleted soil. The introduction of hybrid corn in the last four years has boosted the yields in that crop. Lacking the technical specialists for plant breeding, the Yugoslavs have taken a short cut in producing hybrid corn, using the bulk field method. A yield of 40 bushels to the acre is regarded as good. The yields of

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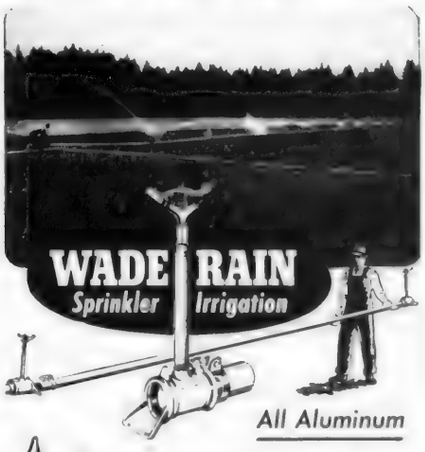

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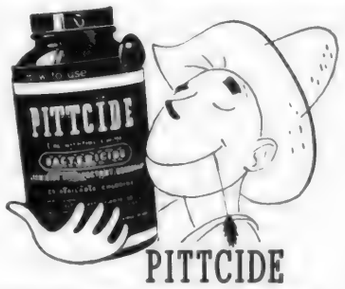

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other crops are in the same proportion. When he can get it, the Yugoslav farmer uses about the same amount of fertilizer as the average farmer uses in the Midwest, up to 400 pounds per acre for corn. He puts his faith in manure rather than in commercial fertilizer. Erosion is not a serious problem, since the small ribbons of cultivated fields have resulted in a form of strip cropping. The rotations, under normal conditions, are corn, grain, grass. Rainfall and temperature are about the same as in the American Midwest.

There are three agricultural colleges on the University level in Yugoslavia. Many secondary agricultural schools give courses of from one to two years, and there is a type of extension training school to which the individual farmer may go for a few weeks during slack time. There is a serious shortage of technical experts and the state experimental farms are handicapped by lack of machinery and experimental equipment. Artificial insemination and cross-breeding on a large scale are almost unknown. However, the Yugoslav farmer is a shrewd one. He is doing good work under handicaps of machinery, seed and fertilizer.

In the United States there are 368,000 tractors of all types for each 15,000,000 population; in Yugoslavia, for the same population, there are less than 10,000 tractors. Although the government claims its goal is complete mechanization of agriculture, the chronic surplus of farm labor will delay this happy hope for some time. More machinery would serve only to point up over population in the rural areas.

Josip At Home

The American from the Midwest would see many familiar things about Josip's little home plot. Dandelions dot the grass in the yard, the lilacs are in bloom, and a clump of lilies of the valley push up beside the kitchen door. Radishes, onions and cabbages are growing in the garden. An egg is an egg anywhere, and the roosters crow in an universal language. The weather is much talked about and just as unpredictable.

When the day's work is done Josip may have an hour of daylight before supper to work in his garden or to take the honey off a stand of bees. When the evening meal is done he often goes straight to bed, for he cannot read a newspaper, he owns no musical instrument, and has no radio. There may be a kolo, a folk dance similar to a reel, in the street in the twilight or a lecture by a comrade from the Party headquarters in Novi Sad. On Sunday he goes to church. He belongs to the Orthodox church, which was his religion in his native mountains. The priest of his native village has come along to Lovcenac, and although services are held in the Roman Catholic church, the old familiar forms are dear to him.

On holidays he and a neighbor may get a wagon and a team of horses from the

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farm stables and drive into Novi Sad to celebrate. The men drink rakija at the dark little bars and the children buy tiny fruit flavored ice balls, or attend the one small movie theatre in the city.

If he has money to spend he will find little for it in the shops. The State store displays a few bolts of cotton cloth, some wooden kitchenware and toys. He cannot buy in all of Novi Sad an iron skillet, but he can buy tiny soap dishes and racks for rubber stamps. This puzzles him, for he can buy no soap and never owned a rubber stamp in his life. In all this large city if all the merchandise were thrown together it would not reach the variety found in an average county seat drugstore in America.

Whatever may be the political complexion of their elders and whatever may be their cultural and economic standing, kids are kids. In Yugoslavia they play ball in the streets, gang up and engage in fights with other gangs, look forward to "gift day", a day which comes a little before our Christmas, and they like American movies, chewing gum and chocolate. Their recent history provides them with an exciting substitute for our "cops and robbers" and "our Indians and cowboys." They play "Partisan and German," and in the alleys and back yards of the village act out the drama of the Liberation.

Capitalism To Communism

In its socialization of agriculture the Yugoslav government has taken advantage of many of the mistakes made by the Russians. Instead of abolishing private ownership of land and organizing collectives at once, the government has preferred to take a slow course; collectivization follows after a period of indoctrination and gradual but inexorable pressures. In theory, joining a cooperative is entirely voluntary, and the steps from private ownership to full socialization, are gradual. There are four types, the difference being mainly one of how the land in the collective is owned.

Type One: Type One is a transition type from the private ownership of land. The owner of the land retains the title when he joins the collective, and receives up to one thousand dinars per hectare annually as rent. In addition, he receives daily wages, and a proportional share of 30 per cent of the net income after all expenses of production are deducted. For instance, if the income from a collective is one million dinars, and the expenses and government levies on the crops and stock amount to 200,000 dinars, the owners of the land receive 30 per cent of the 800,000 dinars, which is divided according to the amount of land they own. The remaining 70 per cent of the 800,000 dinars is divided as wages according to work days put in by the individual worker.

Type Two: In Type Two the owner also retains title to his land but is paid interest of six per cent per year on its value, in place of rental and a share of

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the net income. He also receives his daily wages.

Type Three: In Type Three the peasant turns over or lends his land to the collective without interest or rent but retains title. His entire income is based on how much work he does, and the income that goes into rental and interest in Type One and Type Two is divided as daily wages in this type. This is the most popular with the small land owner and the landless. The peasant believes it is fairer because he is paid according to the amount of work he does. He signs a contract, usually for three years, to remain with the collective.

Type Four: Type Four is socialized farming in its highest form, the ultimate goal of the State. The peasant sells his land to the collective and becomes a communal worker. There are no pure cases of this type in the Republic, and perhaps there are no pure cases of any of the four types. One shades into the other and most are mixtures of all four types. These forms are in a highly fluid state. The government is feeling its way.

In all types he retains title to his home and up to two hectares (4.8 acres) of land for his personal use. On these two hectares he can raise what he wishes. He may keep a cow, as many pigs as he is able to feed on his grain allotment, raise fruit, vegetables, and also carry on a small business of his own if his energy and means permit.

The collectives all have trading functions similar to cooperatives in the United States. Before the present government came into power the peasants had organized cooperatives and these with the Zadrugas gave them a basic understanding of cooperative buying and selling.

A farmer may at any time withdraw from the collective, (except in Type Four) taking his land with him. However, if his land happens to be surrounded by fields in the collective and if his withdrawal will hamper the working of the fields in large units, he is given an equal amount of land outside the collective. In practice the dissatisfied farmer finds it difficult to withdraw. He is very likely to disagree with the committee's appraisal of the value of his land and its worth in a trade. But he has no recourse since the collective itself determines the value of his land and the value of the land exchanged for it. If he wishes to leave farming and go into the city and take a job in the factory he may sell his land to the co-op. He may own property in the city after he gets there. Governments being what they are, and the people being what they are, the individual farmer finds that although he receives more on the free market for his produce, he must also buy on the free market. He finds that seeds, fertilizer, and machinery are often exhausted when he comes to buy.

The Big Squeeze

The real pinch comes when he tries to meet the quotas of crops and stock which he is required to deliver to the State each year and many private farmers complain that the quotas are set so high that they are difficult to meet, forcing them to buy on the black market or on the free market to make up the difference. The way is open to break him in one season.

While the government disclaims any use of force in the socialization of the farms, pointing out that joining a collective is entirely voluntary, yet no effort is made to conceal the ultimate goal which is entire socialization. As a member of the Party put it, "The government persuades the peasant to do that which is most acceptable to him."

The socialization of the land is still largely on paper, but there has been a speed-up since the first of the year. Between January 1 and April 1 of this year the collectives were more than doubled. The government claimed 5,000 collectives in June with more than 200,000 households, but this is only about 15 per cent of the total arable land in the country.

The agrarian reforms are driving large numbers of farmers into the cities, chiefly the larger land holders who more strongly oppose collectivization and the landless, who have nothing to offer a collective. This is a deliberate move on the part of the government, which has bright hopes of industrializing the nation and thereby reducing the pressures of over-population in the rural districts.

Marshal Tito apparently has the backing of the Yugoslavs in his feud with Stalin, and he is respected as much for this as for the rapid recovery the country has made from the ravages of war and occupation. An American newspaperman, who has watched the development of the Comiform-Tito crisis, said, "When the break came Tito packed up thousands of Russian bureaucrats and 'advisors' and shipped them back to Russia. He also asked Stalin to recall a very large military commission. Tito insisted that the Yugoslav Party had enough to do within the country and was not interested in expending energies on international Communism."

The Private Operator

In addition to the four types of collectives, there is the private or individual farmer, by far the largest class. Last May this group included 85 per cent of the farmers in Yugoslavia. His private enterprise is pressed upon from all sides, and his freedom to operate his farm, as an American farmer would operate it, is restricted by many State regulations, although, in theory, he is entirely a free and independent operator. It is not difficult to see that collectivization is all to the advantage of the small land owner or the peasant without any land at all, and it is all to the disadvantage of the middle class farmer which the Russians call the Kulak. Today in Yugoslavia no one may own more than 20 hectares (48 acres) of arable land; all beyond that must be sold to the

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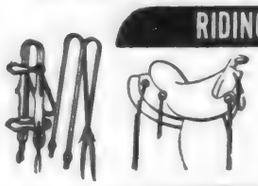

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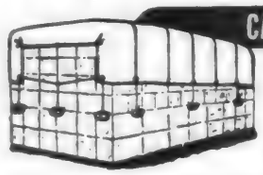

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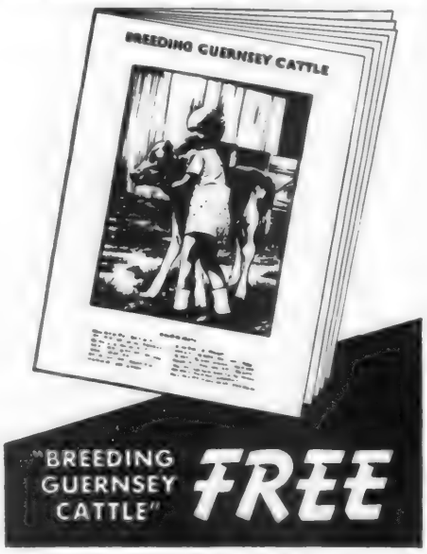

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State. In certain cases additional land beyond 20 hectares may be owned provided it is in forest or marginal pasture, or grazing land. The price of free enterprise is high. The collective has first call on seeds, fertilizer and machinery. And, what is most important, the member of the collective has the ability to buy through the State by the use of coupons at a much cheaper rate than on the free market.

The Peoples Front And The Party

The Peoples Front, a phrase often used behind the Iron Curtain, is said to be the universal surge of the people of Yugoslavia toward a better way of life. It is closely allied with the Party, but while all those in sympathy with its goals and all those engaged in carrying out the program of the government are, in theory, members of the Peoples Front, it does not

YUGOSLAVS sleep between feather mattresses.

necessarily mean that those identified with the Peoples Front are members of the Party. To become a member of the Party one must have a cultural understanding of its principles and be active in its work. Any peasant is eligible to membership if he shows, in the opinion of the committee, the right attitude and can attain the proper cultural "level". The communists claim 500,000 membership in the Party, the bulk in the cities.

The Yugoslav farmer apparently does not feel the constraint which the foreign visitor feels all about him once he has crossed the frontier. If Josip Stanovich cannot put down his hoe and lie down under a tree for an afternoon nap he perhaps feels that substitutes for this freedom are more than adequate. He has noticed himself that when he wishes most for the old freedom his belly is full, which it very frequently was not when he tried to feed a family on two hectares of rocks in the mountains.

He remains a member of the collective on good behavior and may be expelled at any time by vote. He does not move easily from job to job, and from place to place. He finds that when he drives into the city with a load of produce for the free market he is stopped at the outskirts by a soldier at a road block. The soldier examines his papers and sees that he is on legitimate business. He must be able to produce his travel permit and identification papers at any time.

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FARM BOOKS

(Continued from page 20)

letters have been published, this is the first book-length treatment of the subject to be released.

The general approach of the authors is that there is not much the individual farmer can do to influence the price he must pay for his supplies or the money he receives for his product, but that there is a great deal he may be able to do to lower the labor cost of production and increase his profit. Since labor is one of the largest single cost items in farming, the use a farmer makes of it can mean the difference between a large and a small profit or, for that matter, any profit at all. The efficiency with which different farmers use labor, whether their own or that of a hired hand, was found to vary widely. Studies in Vermont, New York, and Minnesota, for example, showed that the man time required each day to machine-milk a cow ranged from 6 to 16 minutes, and that the jaunt farmers walked varied from 156 to 418 feet for each cow while doing the milking. On the poultry farms it was found that five times as many miles were walked and five times as much time consumed in caring for 1,000 hens on the least efficient farms as on the most efficient.

Dr. Vaughn and Dr. Hardin show how work simplification methods can be applied to the individual farm. Their book is divided into two parts: first a section on the place of work simplification in the farming picture; and a second section on the essential studies that must be made to apply the methods to the farm. In the first section the authors discuss the application of efficient methods to various types of farm operations, from hog raising to hand motion jobs such as apple and tomato picking. In this section they show the step by step application of this science to a number of practical farm operations such as dairying and poultry raising. The procedures are illustrated with photographs, drawings and charts along with before-and-after records of labor requirements.

In the second section of the book the study and analysis that must be made of any job before a work simplification program can be applied is discussed. Here the authors draw on the experiences and findings of the men who have been working in this field on the project which they helped to direct.

The Farm Book Store

The Editors of the Farm Quarterly, after a careful selection of current agricultural books, recommend the following to our readers.

Livestock

Feeds and Feeding (21st ed.)—*by F. B. Morrison*.....$7.00
The authoritative book on livestock and poultry feeding.

Dairy Science—*by W. E. Petersen*.....$5.00
680 pages of the best modern dairying practices.

Sheep Science—*by W. G. Kammlade*.....$5.00
The breeds, care and feeding of sheep for wool and mutton production.

Beef Cattle—*by Roscoe R. Snapp*.....$5.00
A carefully revised edition of this excellent book on beef production.

Poultry Handbook—*by Rudolph Seiden*.....$6.00
An alphabetical reference book of poultry information.

Successful Poultry Management—*by M. A. Jull*.....$3.50
A practical book on poultry from brooding to marketing.

Pork Production—*by William W. Smith*.....$4.25
The standard text on the breeding, raising and marketing of hogs.

Swine Enterprises—*by Arthur L. Anderson*.....$3.00
A thorough study of swine raising for the beginner.

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Soils and Fertilizers—*by Firman E. Bear*.....$3.75
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Modern Farm Management—*by Andrew Boss & G. A. Pond*..$5.00
The principles and application of management to the farm.

Farm Work Simplification—*by L. M. Vaughn & L. S. Hardin*..$2.80
A review of this book may be found in the Farm Books column.

Farming for Profit—*by H. R. Herndon*.....$3.75
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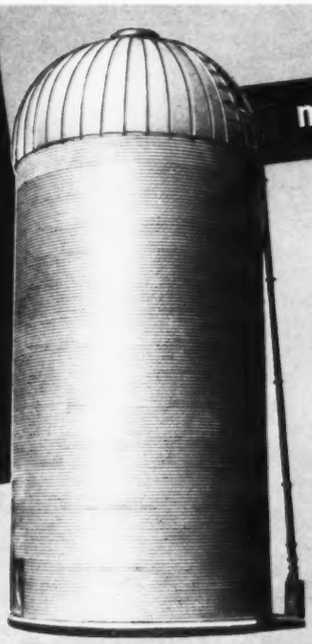

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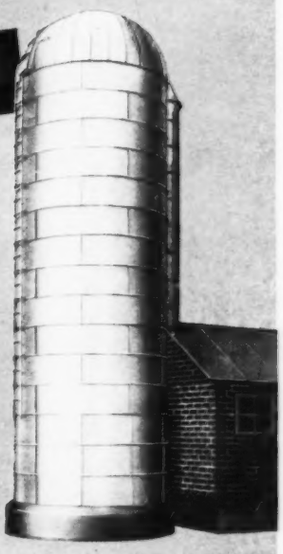

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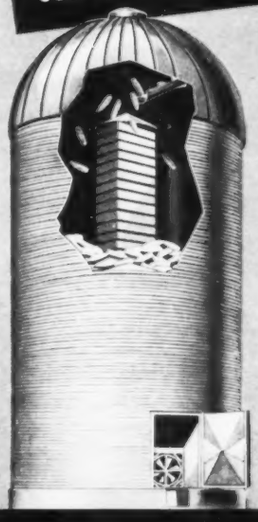

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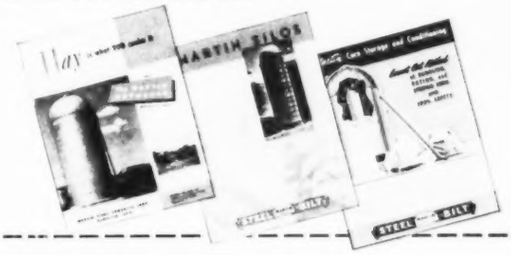

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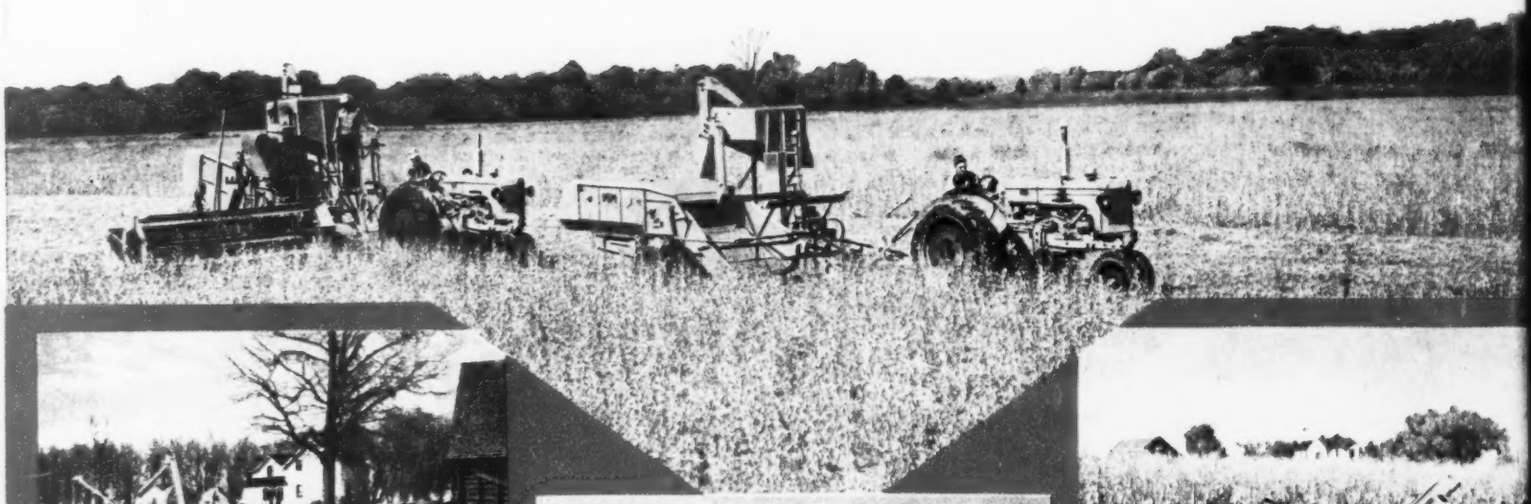

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